

VOLUME TWO

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**CONTAINS
PULLOUTS**

PLATE 1

Conglomerate (subfacies 'A'). A small lens of subrounded metamorphic clasts infilling a small localised scour. The pen (top right) is 14cm long. The conglomerate lens forms part of a stacked sequence of cross-bedded fine sandstones, with frequent internal erosive surfaces and occasional scattered pebbles.

LOCATION - STRATIGRAPHIC: Doulus Conglomerate Member

- GEOGRAPHIC: Doulus Head

PLATE 2

Conglomerate (subfacies 'A'/'C'). Hammer for scale (bottom left) is 35cm long. Three conglomerates in vertical sequence. Although showing some features of subfacies 'A' (large lens to the top left splits and wedges out to top right as two thinner beds; pebble-trains in upper half of photograph suggest foresets with current from left of photograph) the conglomerates and interbedded sands are more sheetlike than the typically small lenticular beds of subfacies 'A', and in that respect are more like subfacies 'C'.

LOCATION - STRATIGRAPHIC: Doulus Conglomerate Member

- GEOGRAPHIC: Doulus Head

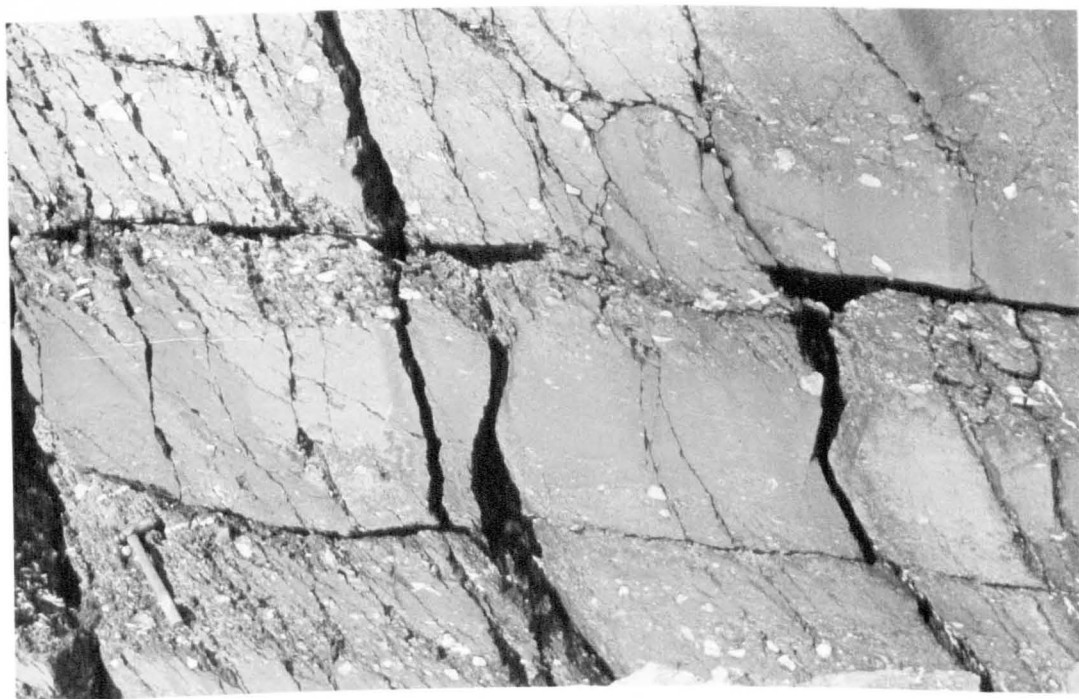


PLATE 3

Conglomerate (subfacies 'B'). Massive matrix-supported conglomerate with rounded metamorphic clasts up to 15cm in diameter. The matrix is poorly sorted silty sandstone. Hammer for scale is 35cm in length. The bed is interpreted as a debris-flow deposit.

LOCATION - STRATIGRAPHIC: Doulus Conglomerate Member

- GEOGRAPHIC: Doulus Head

PLATE 4

Conglomerate (subfacies 'B'). Massive matrix-supported conglomerate exposed on joint surface approximately normal to both bedding and cleavage. Some elongate clasts show an orientation sub-parallel to the strong regional cleavage fabric picked out by the fractures running from the top-left to bottom-right. Bedding dips parallel to the lower right hand edge of the outcrop, and the rock youngs towards the top left of the photograph.

LOCATION - STRATIGRAPHIC: Doulus Conglomerate Member

- GEOGRAPHIC: Doulus Head



PLATE 5

Conglomerate (subfacies 'B'). The hammer (length 35cm for scale) marks the contact between a cross-bedded pebbly sandstone (lower right) and a massive debris-flow conglomerate (upper left). The net was used as a sampling grid to count the clasts in the conglomerate.

LOCATION - STRATIGRAPHIC: Doulus Conglomerate Member

- GEOGRAPHIC: Doulus Head

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PLATE 6

Conglomerate (subfacies 'B' and 'C'). The lower half of the photograph shows a 2 metre thick debris-flow conglomerate (subfacies 'B') with an essentially flat planar base, overlying a cross-bedded sandstone. The upper part of the photograph shows interbedded sand and gravel sheets (subfacies 'C') of sheetflood origin.

LOCATION - STRATIGRAPHIC: Doulus Conglomerate Member

- GEOGRAPHIC: Doulus Head

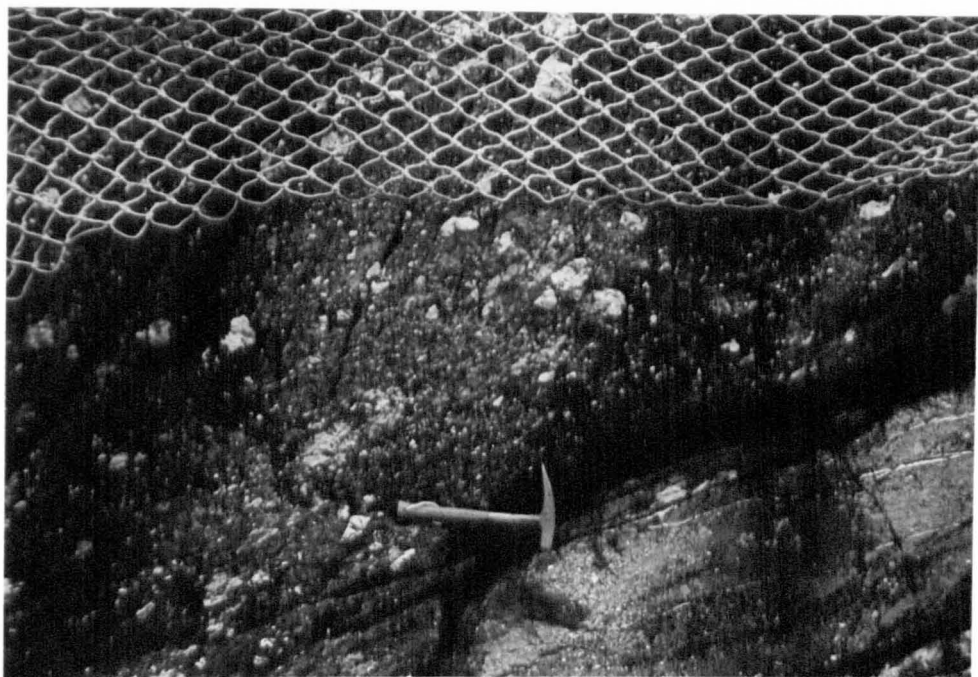


PLATE 7

Clasts from conglomerate facies, showing range of composition; vein quartz (white), quartzite (white and pale pink), jasper (dark red) and mica schist.

LOCATION - STRATIGRAPHIC: Doulus Conglomerate Member

- GEOGRAPHIC: Doulus Head

PLATE 8

Clasts from conglomerate facies, showing range of composition; vein quartz (white), quartzite (reddish pink), quartz tourmaline rock (schorl), granite, haematite, and slightly schistose quartz feldspar rock.

LOCATION - STRATIGRAPHIC: Doulus Conglomerate Member

- GEOGRAPHIC: Doulus Head



PLATE 9

Sandstone body facies. A thin sandstone body (less than 2 metres thickness). Compass clinometer in foreground for scale. Note abrupt shallowly erosive base, stacked sets of cross-bedding, and lack of marked upwards decrease in grain size or scale of sedimentary structures. The sandstones are picked out from the underlying and overlying siltstones by thick vertical quartz filled tension gashes.

LOCATION - STRATIGRAPHIC: St. Finan's Sandstone Formation

- GEOGRAPHIC: Cangarriff Point

PLATE 10

Sandstone body facies. A composite sandstone body, thickness shown in photograph is approximately 5 metres. Note the frequent internal erosional surfaces subdividing the unit into a number of lenticular subunits, with both plane and trough cross-bedding. Note also the shallow nature of the scours, and the presence of frequent thin silty partings lining the erosional surfaces (picked out by weathering).

LOCATION - STRATIGRAPHIC: Ballinskelligs Sandstone Formation

- GEOGRAPHIC: St. Finan's Bay

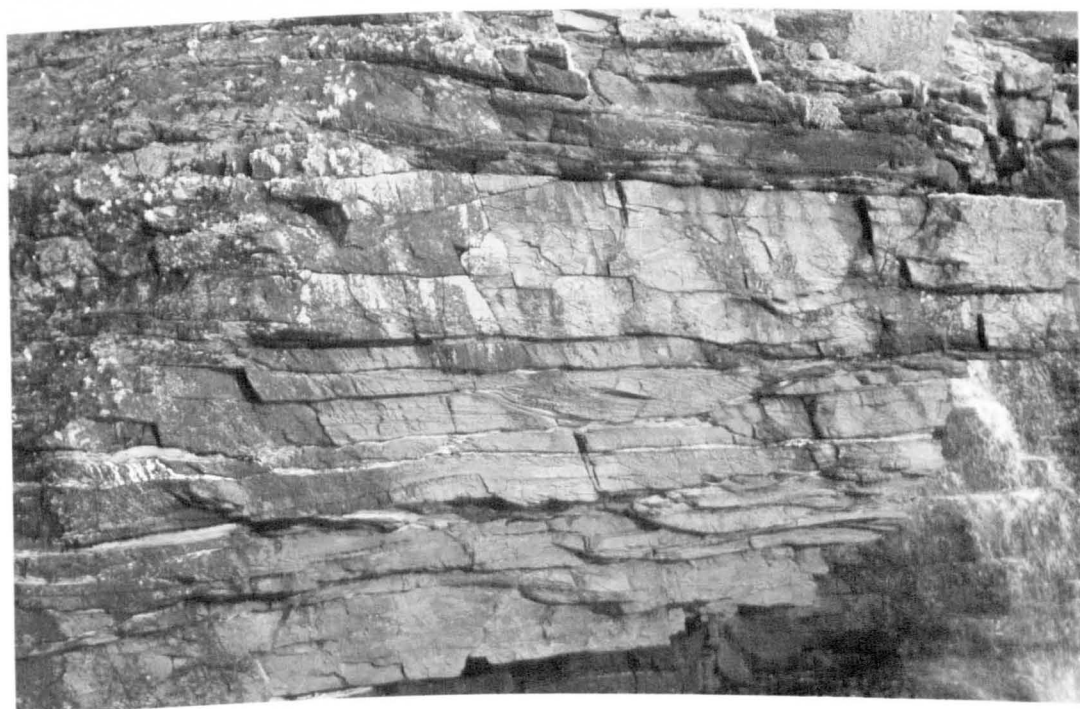


PLATE 11

Sandstone body facies. Hammer for scale is 30cm long. The unit is approximately 1.5 metres thick, younging to the top right. Faint traces of tabular cross-bedding (current from top left to lower right) are visible in the top of the photograph, up-dip from the hammer. The unit consists of at least four vertically stacked sets of cross-beds. The base and top of the unit are essentially planar. The faintness of the bedding makes it difficult to trace internal erosive surfaces, but there is some indication of minor downcut.

LOCATION - STRATIGRAPHIC: St. Finan's Sandstone Formation
- GEOGRAPHIC: S. of Keel Strand

PLATE 12

Sandstone body facies. Trough cross-bedded sets from the base of the facies unit; perspex grainsize scale is 15cm long. Note thin silty parting with abrupt upper and lower contacts, approximately 7cm above grainsize scale.

LOCATION - STRATIGRAPHIC: St. Finan's Sandstone Formation
- GEOGRAPHIC: St. Finan's Bay



PLATE 13

Sandstone body facies. Hammer for scale is 30cm long. Photograph shows details of an internal scouring surface within the facies unit. Lower part of photograph shows clearly bedded sandstone (part of a trough cross-bedded set), upper part is massive sandstone overlying an erosive surface downcutting at least 20cm.

LOCATION - STRATIGRAPHIC: St. Finan's Sandstone Formation

- GEOGRAPHIC: St. Finan's Bay

PLATE 14

Sandstone body facies. Perspex grainsize scale is 15cm long. Photograph shows detail of an internal scouring surface within the facies unit. Generally massive sandstone in lower part of photograph develops thin flaggy lamination towards the top, which is clearly truncated by the shallowly downcutting base of the overlying sandstone bed.

LOCATION - STRATIGRAPHIC: St. Finan's Sandstone Formation

- GEOGRAPHIC: St. Finan's Bay

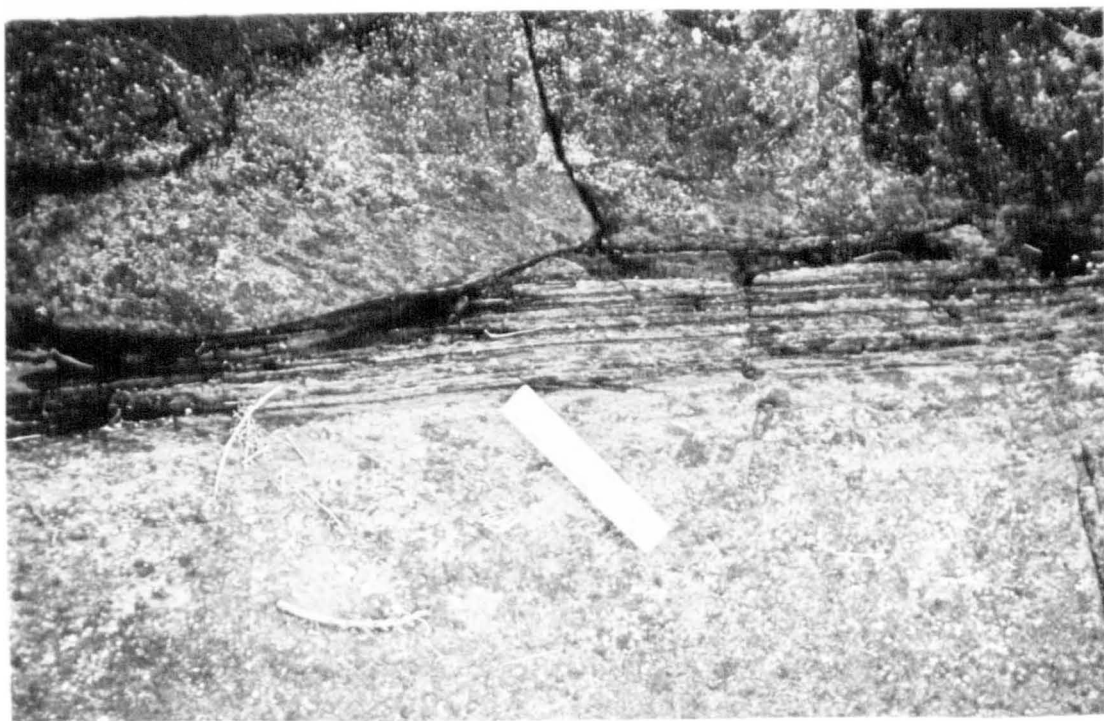
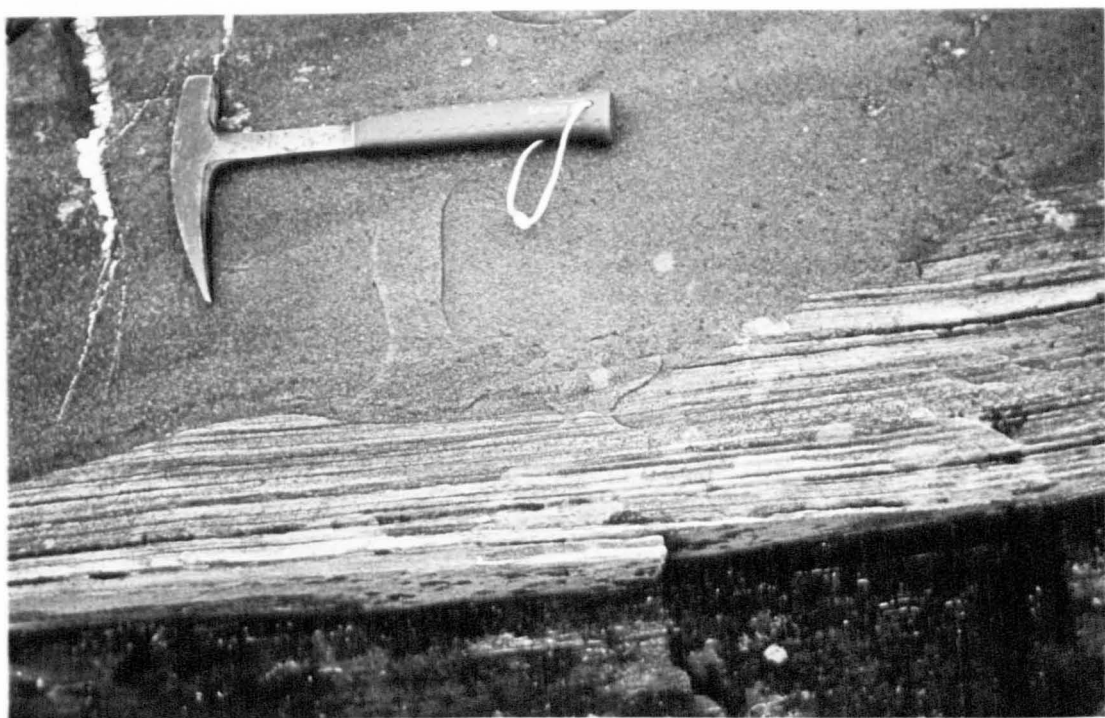


PLATE 15

Sandstone body facies. Hammer for scale is 30cm long. Detail within a facies unit showing a locally thickly developed silty parting, overlain by a clearly trough cross-bedded sandstone bed.

LOCATION - STRATIGRAPHIC: St. Finan's Sandstone Formation

- GEOGRAPHIC: St. Finan's Bay

PLATE 16

Sandstone body facies. Hammer for scale is 30cm long. An unusual development of unidirectional small to medium scale cross-bedded sets. The bases of foresets are strongly tangential, suggesting a relatively high rate of bed-load transportation, but preservation of ripple crests and in some cases the stoss side indicates that the sediment deposition rate must also have been high.

LOCATION - STRATIGRAPHIC: St. Finan's Sandstone Formation

- GEOGRAPHIC: St. Finan's Bay

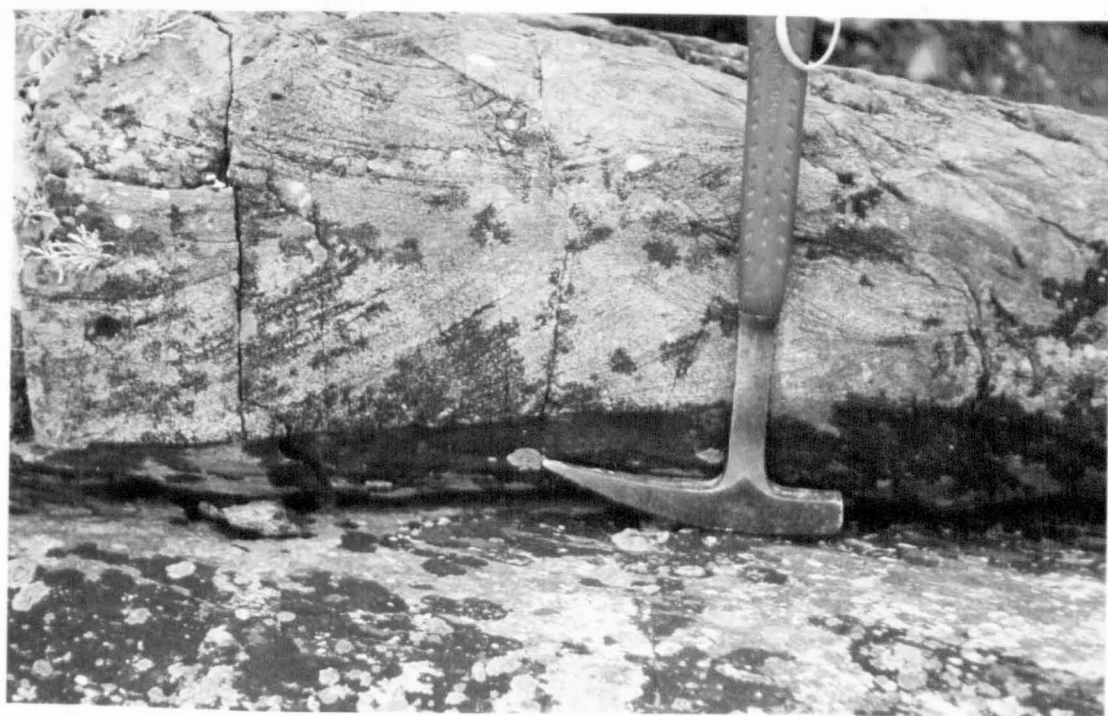


PLATE 17

Sandstone body facies. Hammer for scale is 30cm long.

Soft-sediment deformation affecting trough cross-bedded sandstone.

Note the angular crests and broad troughs of the deforming folds, and orientation of axial planes approximately normal to the base of the sandstone bed. The deformation is interpreted as due to vertical water escape during compaction.

LOCATION - STRATIGRAPHIC: Ballinskelligs Sandstone Formation

- GEOGRAPHIC: Bolus Head

PLATE 18

Sandstone body facies. Pen for scale is 15cm long. Photograph shows parting lineation texture on a bedding-plane surface, within a plane-bedded sandstone. The long axis of the pen is parallel to the indicated paleocurrent.

LOCATION - STRATIGRAPHIC: St. Finan's Sandstone Formation

- GEOGRAPHIC: St. Finan's Bay

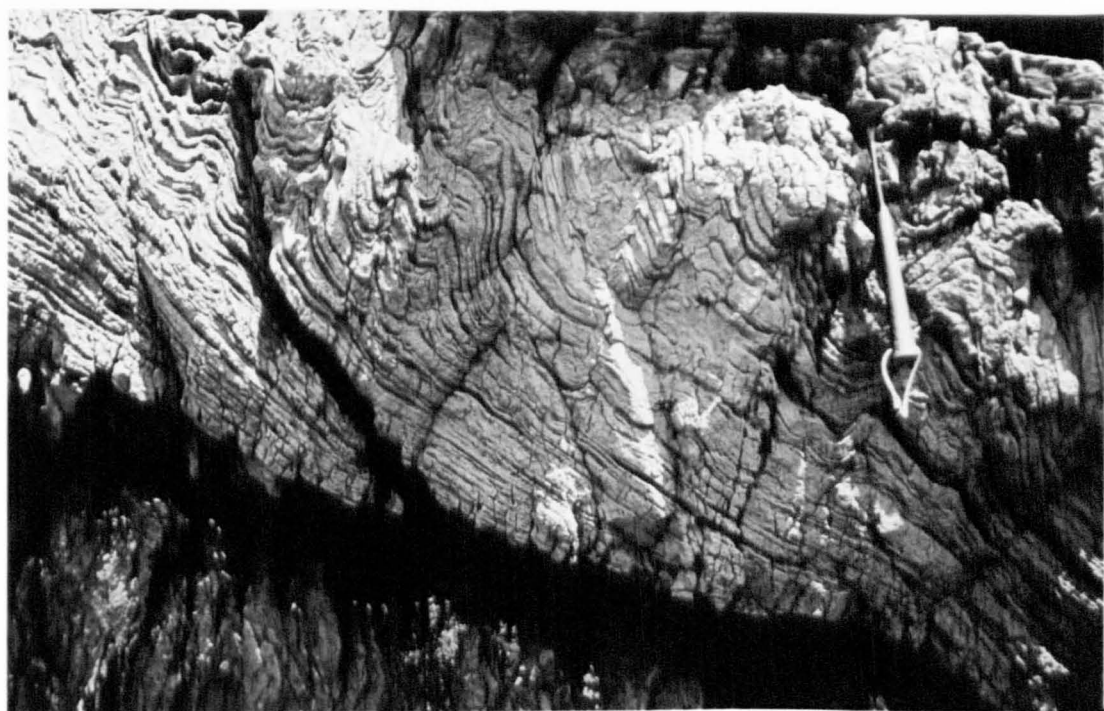


PLATE 19

Rippled and laminated facies. Grouped beds of silty very fine sandstone (10-30cm thick) are separated by fine siltstone interbeds. The sandstone beds are faintly bedded with traces of climbing ripple cross-lamination and flat-laminated bedding. Some disturbed bedding can be seen in the middle of BED NUMBER 4. The bases of the sandstone beds are abrupt with very slight erosional downcutting in places.

LOCATION - STRATIGRAPHIC: Valentia Slate Formation

- GEOGRAPHIC: Puffin Sound

PLATE 20

Rippled and laminated facies. The rippled and laminated silty sandstone beds show up as slightly more prominent and darker than the sand-laminated siltstones above and below. Thin siltstone partings or interbeds pick out the way in which the sandstone beds can wedge out, or split and thicken along strike. The basal sandstone in the centre and right of the photograph is locally thinned due to erosive downcutting by the overlying bed. Note the sheetlike geometry of bedding in the sand-laminated siltstone facies.

LOCATION - STRATIGRAPHIC: Valentia Slate Formation

- GEOGRAPHIC: Puffin Sound

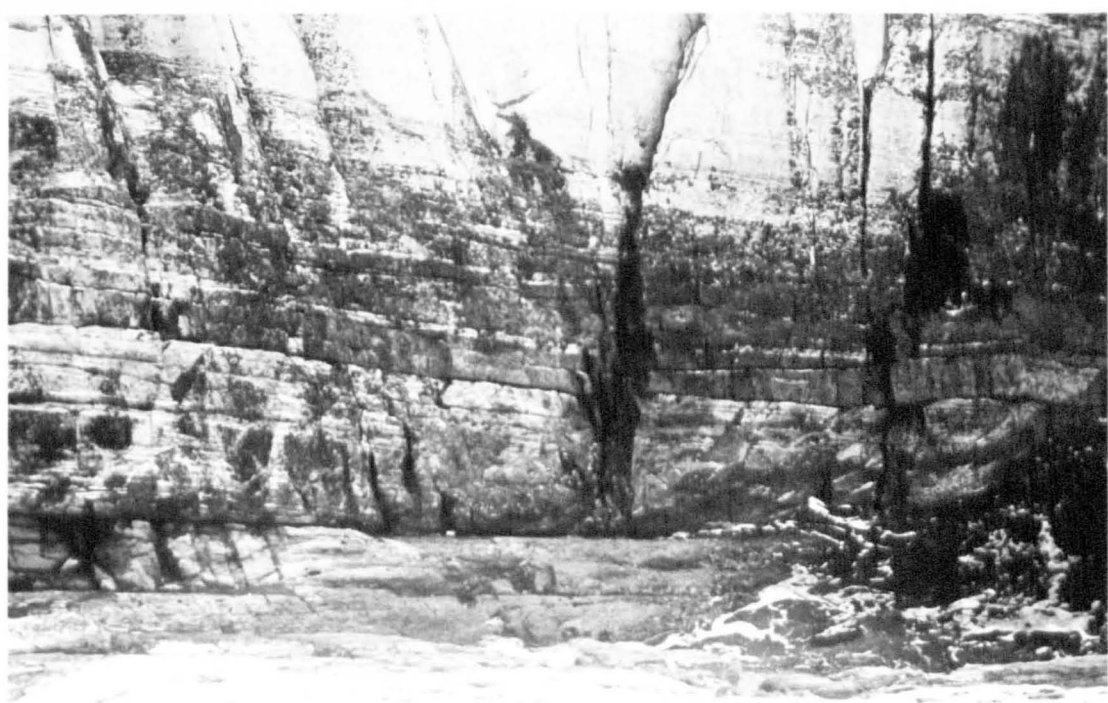
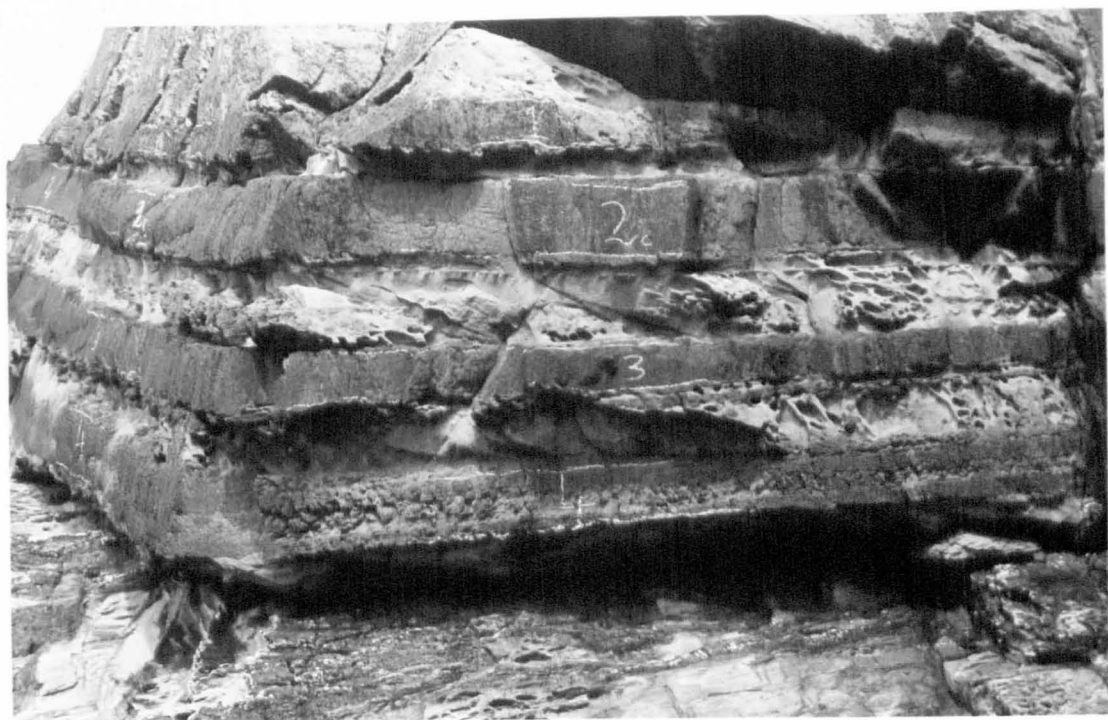


PLATE 21

Rippled and laminated facies. The three thick darker coloured beds towards the middle of the photograph form a 60cm thick unit of rippled and laminated very fine sandstone facies. The top and base of the unit are planar and the apparent slight flexure is an illusion due to changes in orientation of the cliff face. Note the merging of sandstone beds as a thin siltstone interbed wedges out to the left.

LOCATION - STRATIGRAPHIC: Valentia Slate Formation

- GEOGRAPHIC: Puffin Sound

PLATE 22

Rippled and laminated facies. Close-up view of a well-weathered surface shows three sandstone beds (separated by two thin (2-3cm) siltstone interbeds). The lower siltstone bed coincides with a quartz-lined fracture and has partly weathered out. The lower and upper sandstone beds are dominated by ripple cross-lamination, slightly climbing in places with good stoss-side preservation. The thinner middle sandstone bed was affected by soft-sediment deformation and the top planed off by erosion before the overlying beds were deposited. 50 pence piece (= 3cm diameter) for scale.

LOCATION - STRATIGRAPHIC: Valentia Slate Formation

- GEOGRAPHIC: North Coast, Valentia Island

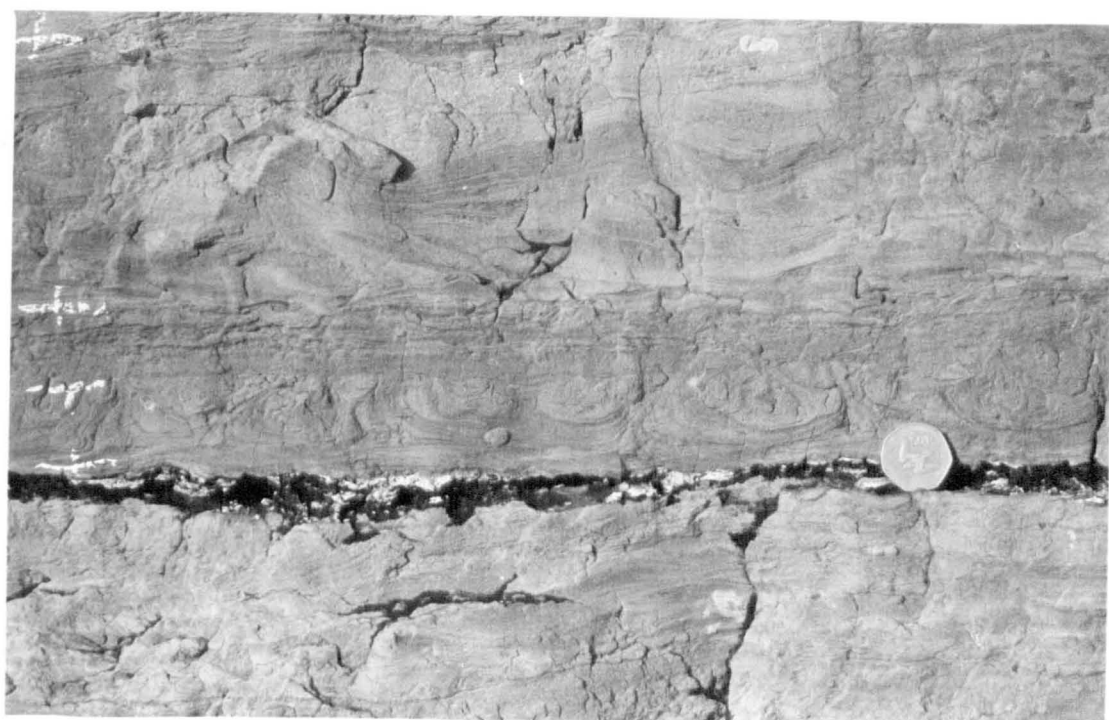


PLATE 23

Rippled and laminated facies. Two beds of climbing ripple cross-laminated very fine sandstone. Flat-lamination and gently climbing ripple cross-lamination in the base of the lower bed, merge upwards into more steeply climbing cross-laminated sets. The upper bed is completely dominated by climbing ripple cross-lamination. Scale bar is 15cm in length.

LOCATION - STRATIGRAPHIC: St. Finan's Sandstone Formation
- GEOGRAPHIC: St. Finan's Bay

PLATE 24

Rippled and laminated facies. The beds in the photograph are between 20 and 60cm in thickness. The lower two are flat-laminated with the upper one becoming cross-laminated just at the top. A deeply weathered thin siltstone parting separates these from two thicker overlying beds in which cross-lamination predominates. The lower of the two fines at the top to sandy siltstone, and is truncated by the erosive base of the bed above.

LOCATION - STRATIGRAPHIC: St. Finan's Sandstone Formation
- GEOGRAPHIC: St. Finan's Bay

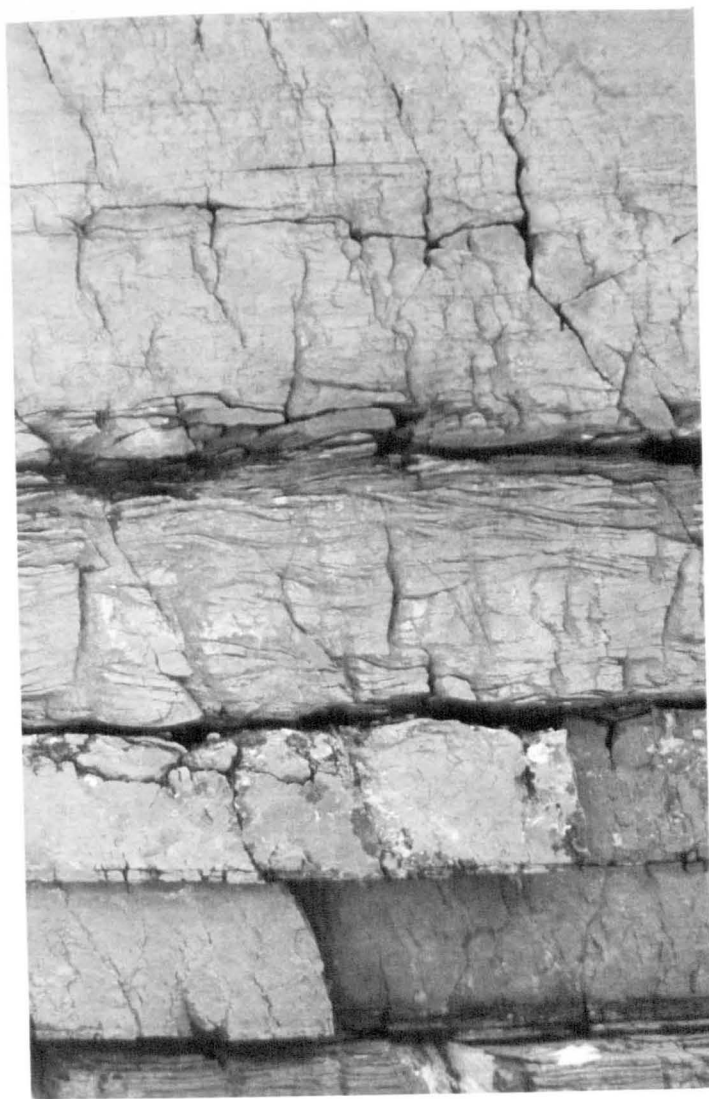


PLATE 25

Rippled and laminated facies. Very fine sandstone with climbing ripple cross-lamination excellently picked out by weathering. The rocks young to the right. The base of the bed is erosive with shallow downcutting into the underlying siltstone. Note the high angle of climb of the ripple sets and the uniform style of deposition within the bed. The hand-lens for scale is approximately 1cm thick.

LOCATION - STRATIGRAPHIC: Ballinskelligs Sandstone Formation
- GEOGRAPHIC: Ducalla Head

PLATE 26

Rippled and laminated facies. Ripple cross-laminated very fine sandstone. Trough cross-lamination in the lower part passes up into climbing ripple cross-lamination in the upper part. The hand-lens for scale is approximately 2.5cm in diameter.

LOCATION - STRATIGRAPHIC: Ballinskelligs Sandstone Formation
- GEOGRAPHIC: Ducalla Head

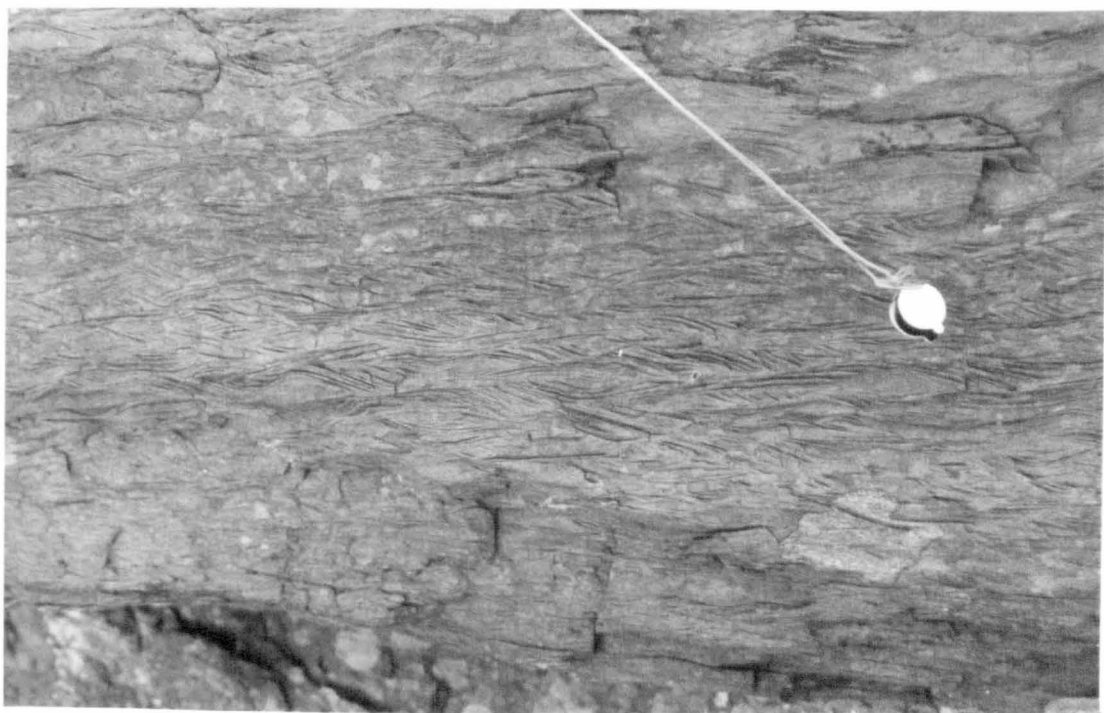


PLATE 27

Rippled and laminated facies. Straight-crested asymmetric ripples exposed on a bedding plane in a unit of silty very fine sandstone.

LOCATION - STRATIGRAPHIC: St. Finan's Sandstone Formation

- GEOGRAPHIC: Cangarriff Point

PLATE 28

Rippled and laminated facies. Straight-crested ripples exposed on a bedding plane at the top of a unit of rippled and laminated facies.

LOCATION - STRATIGRAPHIC: St. Finan's Sandstone Formation

- GEOGRAPHIC: St. Finan's Bay

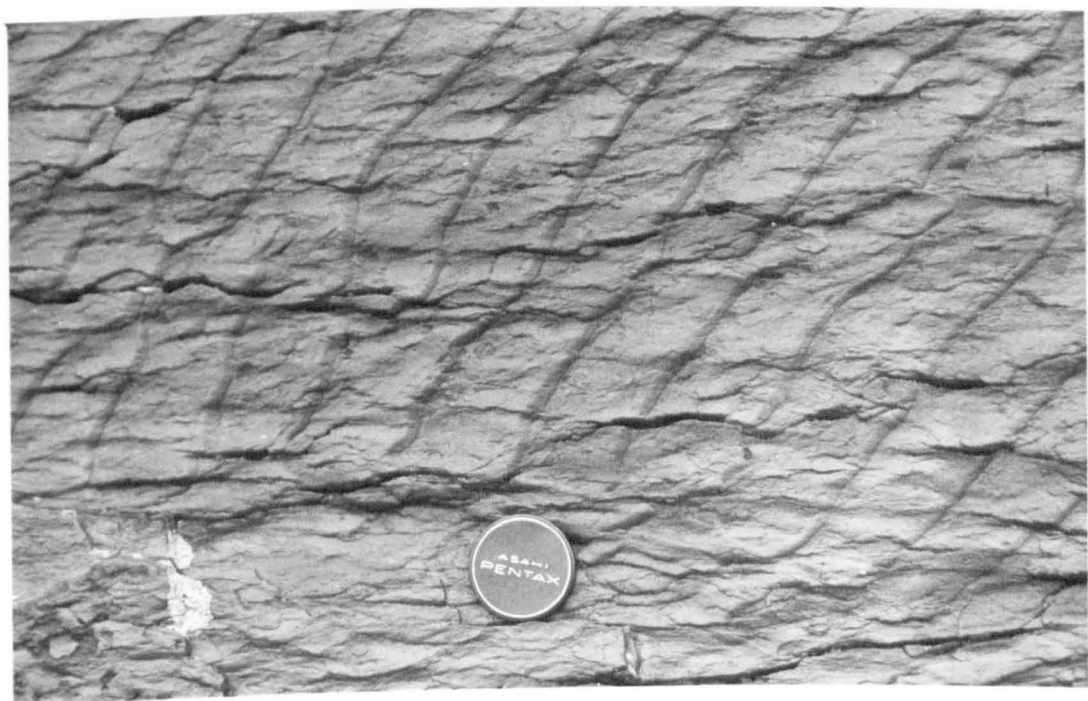


PLATE 29

Sand-laminated siltstone facies. Fine-grained channel-fill, infilling an erosional scour approximately 4m deep. Both the scour-fill and the rock in which the feature is incised are of similar fine-grained sand-laminated siltstone facies. Small localised scours less than 1m deep are occasionally observed in this facies, but the feature shown here was the only one of such magnitude observed. Right hand side of photograph shows approximately 12m thickness of sediments.

LOCATION - STRATIGRAPHIC: Valentia Slate Formation

- GEOGRAPHIC: Puffin Sound

PLATE 30

Sand-laminated siltstone facies. Apart from a 2-3m sandstone at the base of the cliff and another similar one partly covered by scree at the cliff top, the face exposed consists of a thick sequence of sand-laminated siltstone facies. Note the sheetlike geometry of bedding. Cliff is approximately 50m in height.

LOCATION - STRATIGRAPHIC: Valentia Slate Formation

- GEOGRAPHIC: Puffin Sound



PLATE 31

Sand-laminated siltstone facies. A general view to show the overall sheetlike geometry of the bedding in this facies. The cliff face is approximately 7m high.

LOCATION - STRATIGRAPHIC: Valentia Slate Formation

- GEOGRAPHIC: N. Coast of Valentia Island

PLATE 32

Sand-laminated siltstone facies. A close-up photograph showing the thin alternation of siltstone and coarse siltstone/very fine sandstone beds typical of this facies. The photograph also shows the difficulty of examining fine structural details which are largely obscured by the closely spaced subvertical cleavage fabric.

LOCATION - STRATIGRAPHIC: Valentia Slate Formation

- GEOGRAPHIC: Puffin Sound

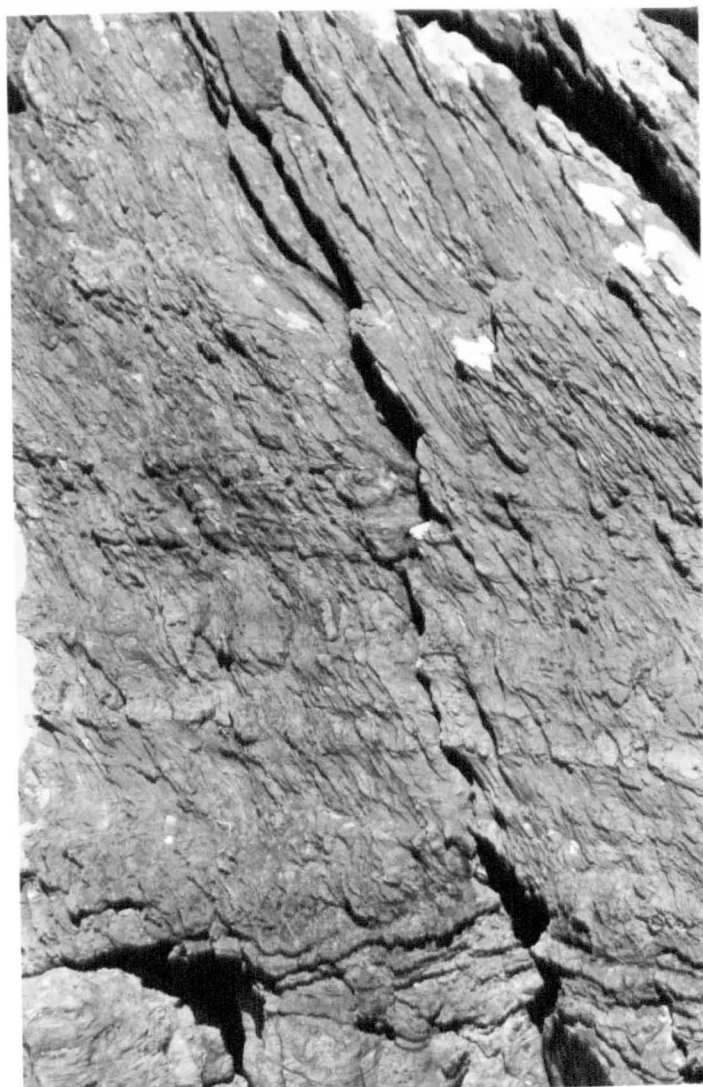
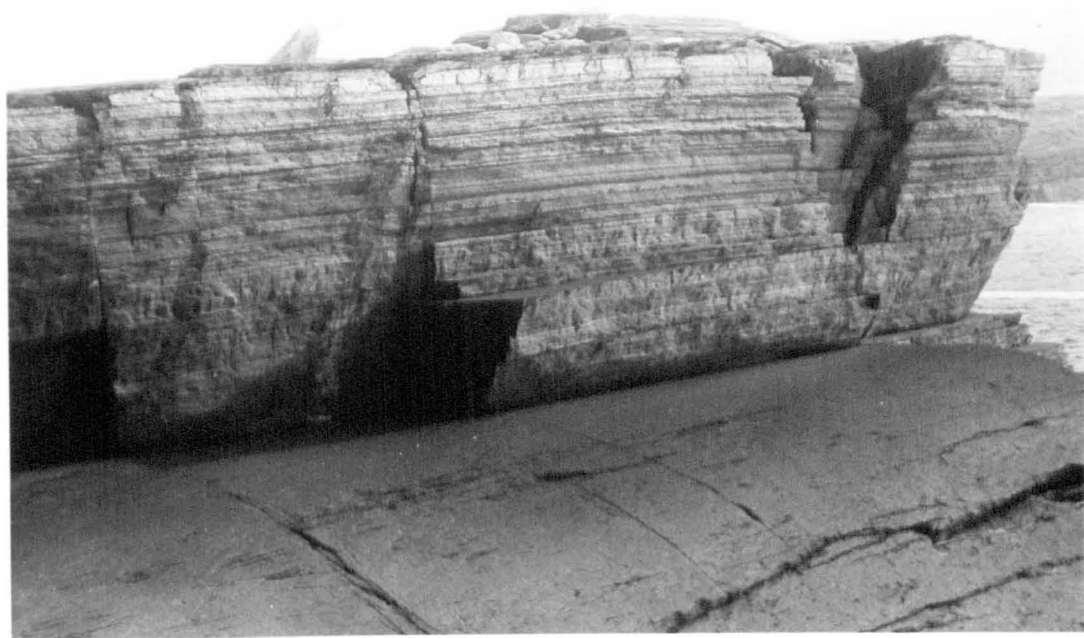


PLATE 33

Sand-laminated siltstone facies. Thin beds of coarse silt/very fine sandstone are broken and disrupted by bioturbation. A minor scour feature downcutting 10cm is infilled by the same facies. Hand-lens for scale is 2.5cm in diameter.

LOCATION - STRATIGRAPHIC: St. Finan's Sandstone Formation

- GEOGRAPHIC: St. Finan's Bay

PLATE 34

Sand-laminated siltstone facies. The coarser laminations are dominant in the lower half of the photograph, while the finer siltstone beds are dominant in the upper half. Ripple cross-lamination is locally developed in the coarse-dominant part of the unit, but the presence of frequent siltstone laminations differentiate between this and the rippled and laminated facies.

LOCATION - STRATIGRAPHIC: St. Finan's Sandstone Formation

- GEOGRAPHIC: St. Finan's Bay



PLATE 35

Sand-laminated siltstone facies. Polygonal dessication cracks exposed on a bedding plane surface. The sand-infilled cracks penetrate a fine-grained siltstone. Compass clinometer gives scale.

LOCATION - STRATIGRAPHIC: St. Finan's Sandstone Formation

- GEOGRAPHIC: St. Finan's Bay

PLATE 36

Sand-laminated siltstone facies. A cross-section of a sand-infilled dessication crack. The sand-laminated siltstone facies here consists of alternations of coarse and fine siltstone, and the top of the unit is penetrated to a depth of 8cm by the dessication crack.

LOCATION - STRATIGRAPHIC: St. Finan's Sandstone Formation

- GEOGRAPHIC: St. Finan's Bay

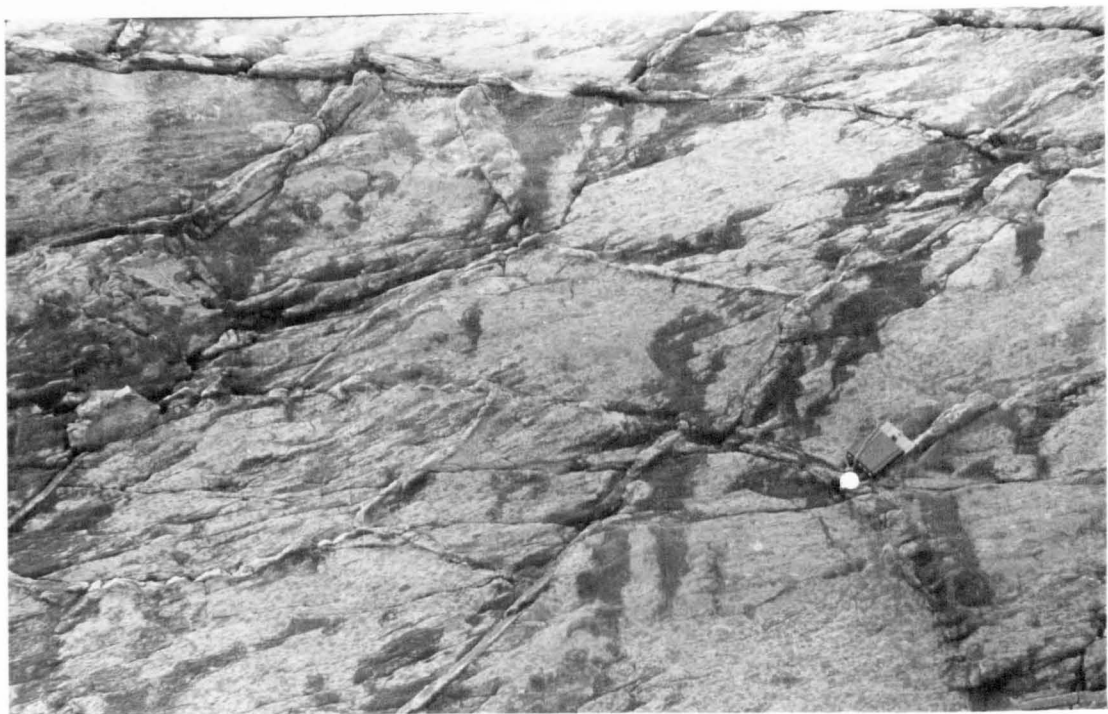


PLATE 37

Bioturbated facies. A typical example showing the pronounced textured mottline, faint 'ghost' traces of original bedding, and recognisable small burrow traces. The lithology is now a silty very fine sandstone, but from traces of bedding was probably originally deposited as a 'sand-laminated siltstone' facies. Hammer for scale.

LOCATION - STRATIGRAPHIC: Valentia Slate Formation

- GEOGRAPHIC: North of Keel Strand

PLATE 38

Bioturbated/sand-laminated siltstone facies. The photograph shows a unit of sand-laminated siltstone facies overlain by a unit of bioturbated facies. The contact follows the base of a small erosional scour, but appears to locally extend below it. Thickness of sediment shown in photograph is approximately 50cm.

LOCATION - STRATIGRAPHIC: Valencia Slate Formation

- GEOGRAPHIC: St. Finan's Bay



PLATE 39

Bioturbated facies. A slightly finer grained example of the facies in which virtually none of the original bedding traces remain. A moderately sized burrow trace is seen passing behind the cord attached to the hand-lens. The hand-lens for scale is approximately 2.5cm in diameter.

LOCATION - STRATIGRAPHIC: St. Finan's Sandstone Formation

- GEOGRAPHIC: St. Finan's Bay

PLATE 40

Massive mudstone facies. The fine-grained rocks show no apparent bedding in the outcrop. Vertical light coloured streaks are calcite filled fractures. Hammer for scale.

LOCATION - STRATIGRAPHIC: Purple Sandstone Formation

- GEOGRAPHIC: Sneem River

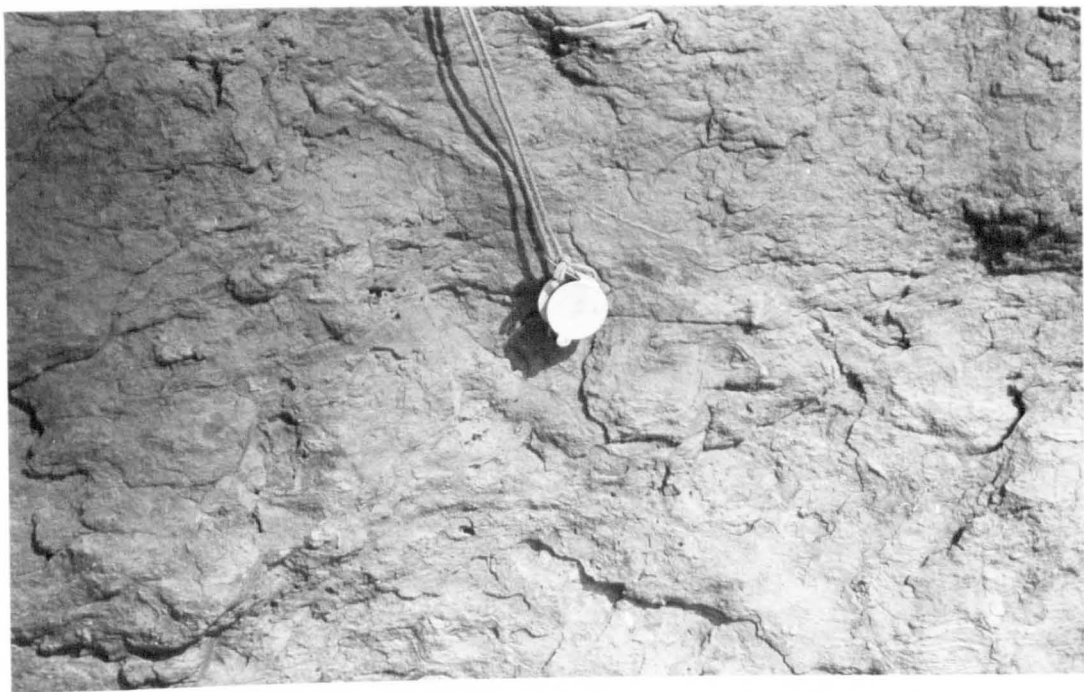


PLATE 41

Massive mudstone facies. Close-up of the facies. The faint mottled light/dark appearance is due to fine nodules of calcite scattered in the mudstone. The facies is generally a deep reddish purple colour, but two deformed pale green reduction spots are present in the upper part of the photograph, just left of the hammer head.

LOCATION - STRATIGRAPHIC: Derryquin Sandstone Formation

- GEOGRAPHIC: Sneem River

PLATE 42

Massive mudstone facies. The photograph shows a locally developed horizon of pedogenic nodular carbonate. The shapes of the nodules have been partly modified by pressure solution along the vertical cleavage fabric. A bed of concentrated reworked nodules, abraded and well-rounded, can be seen in the upper right hand side of the photograph.

LOCATION - STRATIGRAPHIC: Derryquin Sandstone Formation

- GEOGRAPHIC: Sneem River

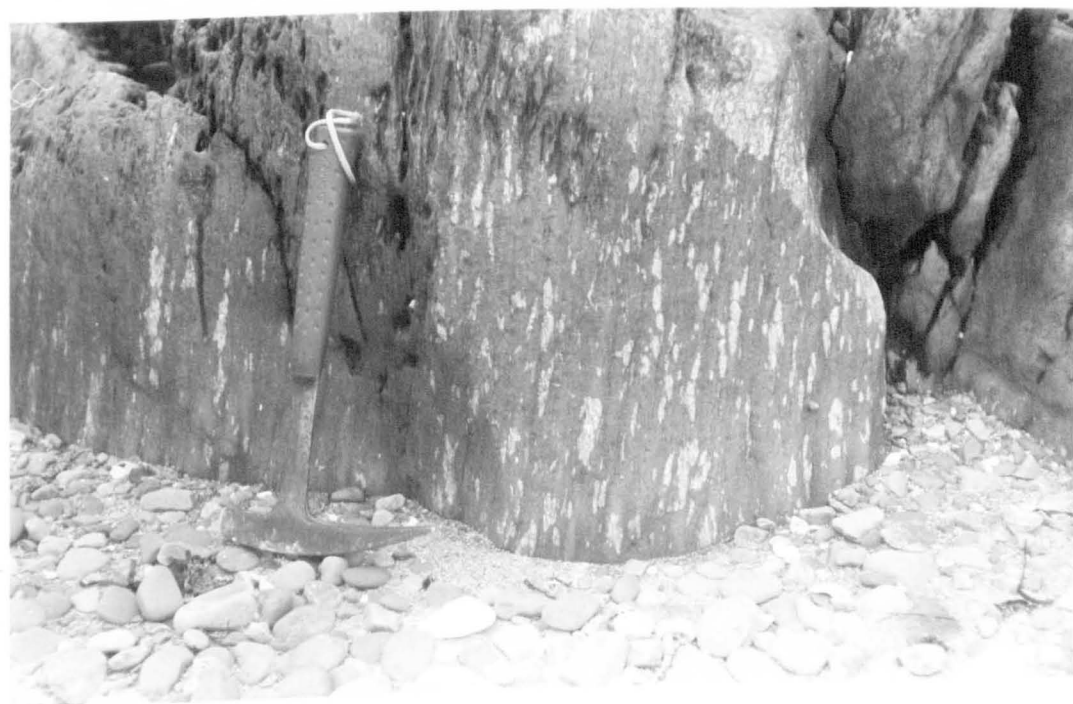
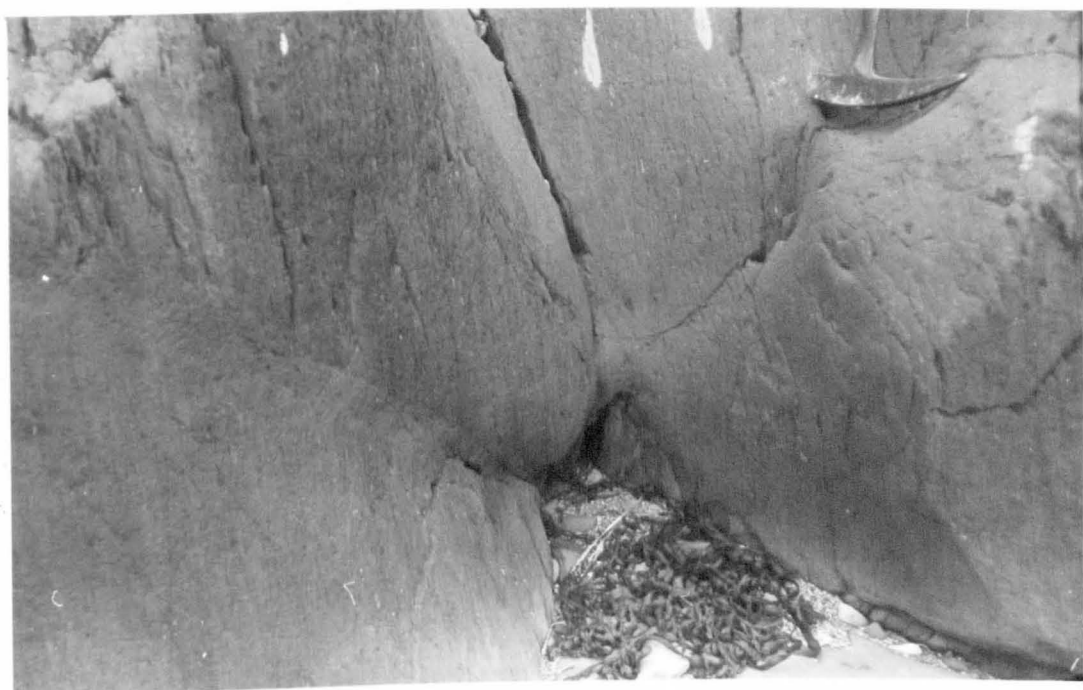


PLATE 43

Nodular pedogenic carbonate. The lower left of the photograph is a mudstone in which the honeycomb weathering is picking out patches of pedogenic carbonate. Some pale coloured nodules are visible above the rapidograph pen in the centre. The top of the unit is truncated by the erosive base of an overlying sandstone.

LOCATION - STRATIGRAPHIC: Purple Sandstone Formation

- GEOGRAPHIC: Sneem River

PLATE 44

Grey quartzitic sandstone facies. Large well-developed foresets in sets up to 1m thick. The flaggy appearance is due to the presence of thin clay drapes lining the foresets.

LOCATION - STRATIGRAPHIC: Rossmore Sandstone Formation

- GEOGRAPHIC: Rossmore Island

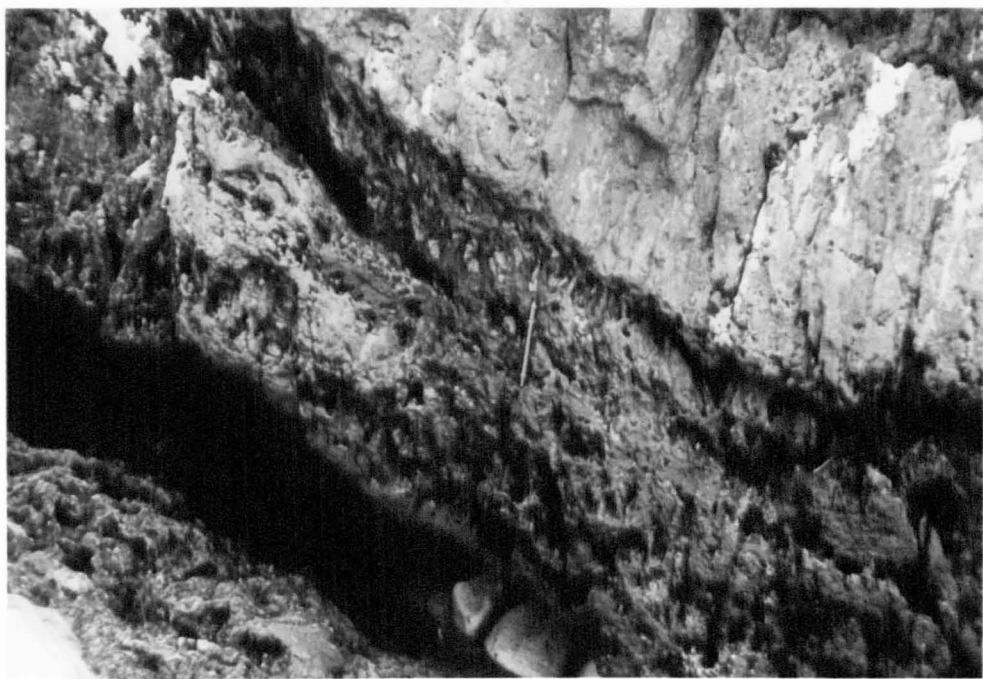


PLATE 45

Grey quartzitic sandstone. A pisolitic lag conglomerate at the base of a sandstone unit. Faint traces of trough cross-bedding are present in the upper part of the lag. Hammer for scale.

LOCATION - STRATIGRAPHIC: Rossmore Sandstone Formation

- GEOGRAPHIC: Rossmore Island

PLATE 46

Grey quartzitic sandstone/sand-lensed grey siltstone facies. A medium to coarse grained sandy lag shows small-scale cross-bedding and ripple cross-lamination. In this case, the typical grey quartzitic sandstone is not developed, instead a series of thin upwards-fining sandstone beds more akin to the sand-lensed grey siltstone facies occur. Hammer for scale.

LOCATION - STRATIGRAPHIC: Rossmore Sandstone Formation

- GEOGRAPHIC: Rossmore Island

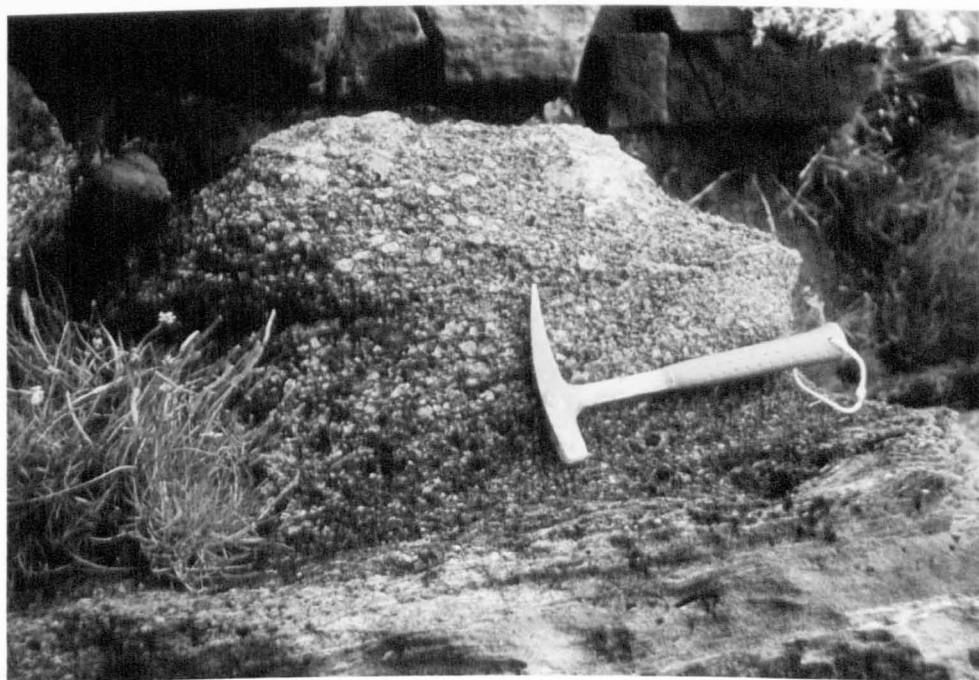


PLATE 47

Grey siltstone facies. A general view shows the sheetlike geometry and slightly flaggy appearance of the facies. Hammer for scale.

LOCATION - STRATIGRAPHIC: Rossmore Sandstone Formation

- GEOGRAPHIC: Rossmore Island

PLATE 48

Grey siltstone facies. A closer view shows lamination and occasional cross-laminated lenses within the facies. Grainsize changes are picked out by the weathering and slightly 'flaggy' appearance, although they are not as distinct and sharply defined as in the heterolithic facies. Hammer for scale.

LOCATION - STRATIGRAPHIC: Rossmore Sandstone Formation

- GEOGRAPHIC: Rossmore Island

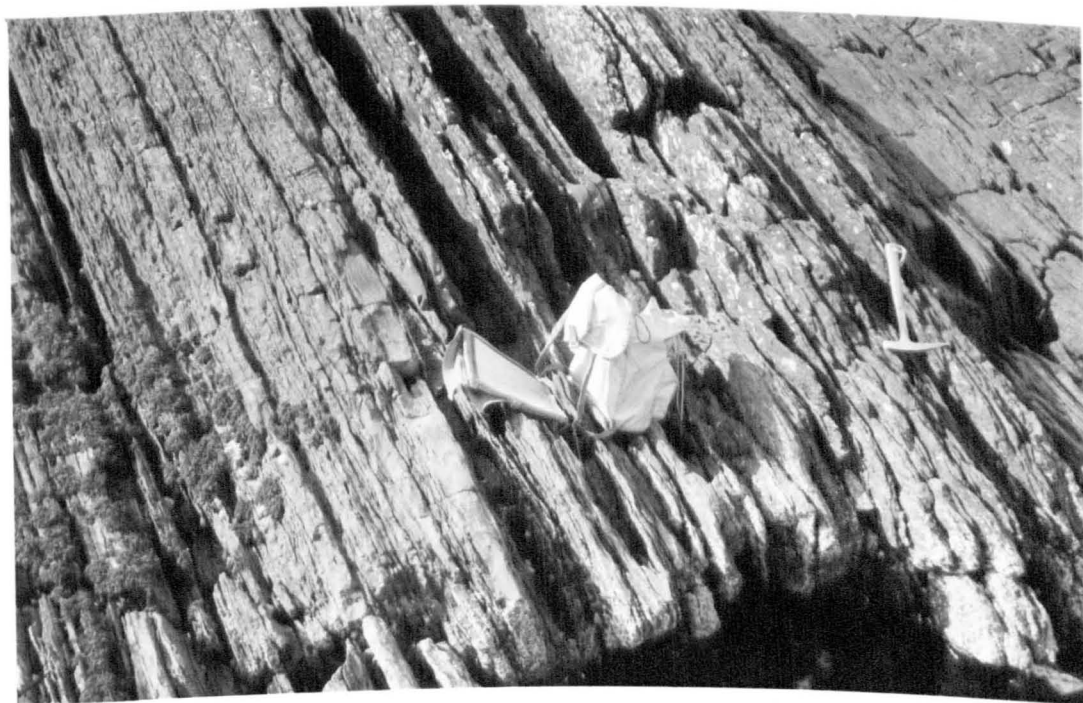
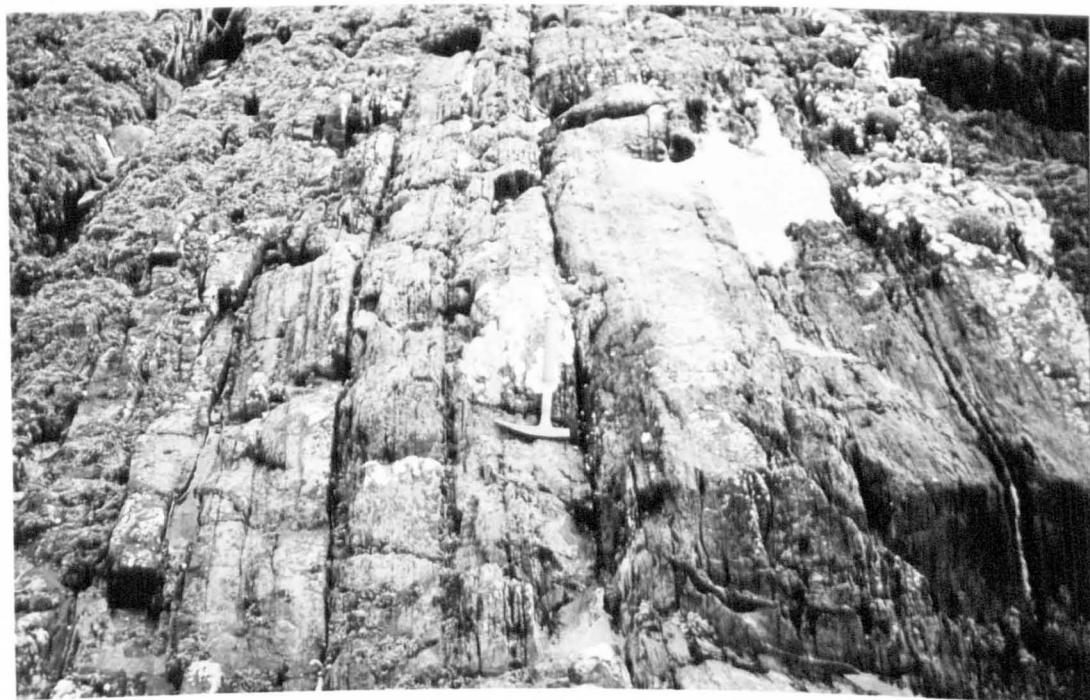


PLATE 49

Sand-lensed grey siltstone facies. A general view of a typical development of this facies. Thin lenticular or 'pinch and swell' sandstones are separated by thin grey siltstones. Width of outcrop exposes approximately 10m thickness of sediments in the photograph.

LOCATION - STRATIGRAPHIC: Rossmore Sandstone Formation

- GEOGRAPHIC: Rossmore Island

PLATE 50

Sand-lensed grey siltstone facies. A closer view shows small isolated lenses, and the 'pinch and swell' behaviour of the thicker sandstone beds. Some of the sandstone beds are faintly cross-laminated, although good sorting causes most of them to appear massive. Hammer for scale.

LOCATION - STRATIGRAPHIC: Rossmore Sandstone Formation

- GEOGRAPHIC: Rossmore Island



PLATE 51

Heterolithic facies. A wave-polished surface shows the sharp segregation of grainsizes, so that the change from sandstone to siltstone or claystone is abrupt and well-defined. Both flaser and linsen bedding types (Reineck and Singh, 1973) occur. Note the abundance of horizontal and subvertical burrow traces. The photograph shows approximately 50cm thickness of sediment.

LOCATION - STRATIGRAPHIC: Rossmore Sandstone Formation

- GEOGRAPHIC: Rossmore Island

PLATE 52

Heterolithic facies/grey siltstone facies. The lower part of the photograph shows grey siltstone facies. With upwards improvement in grainsize segregation the facies changes to heterolithic, with thin continuous very fine sandstone laminations. Grainsize scale is 15cm in length.

LOCATION - STRATIGRAPHIC: Rossmore Sandstone Formation

- GEOGRAPHIC: Rossmore Island

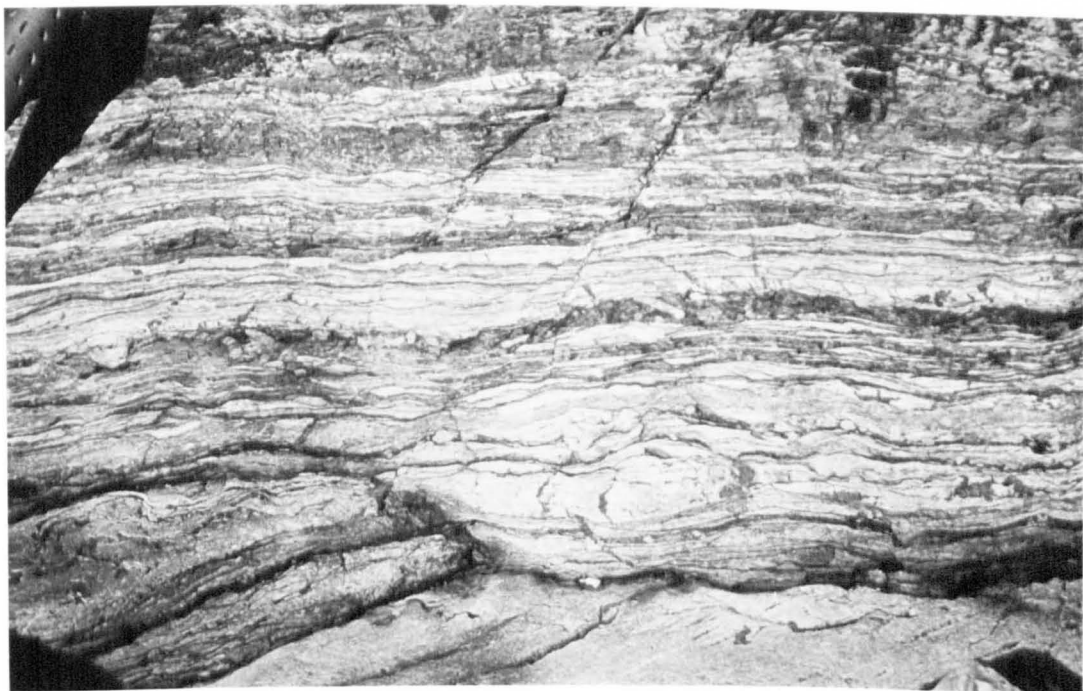


PLATE 53

Heterolithic facies. A polished slab showing both flaser and linsen bedding. Ripple cross-lamination lenses show complex bundle-wise upbuilding in some cases. Burrow traces and minor water-escape sand plumes are present in the lower flaser-bedded part of the block. The block is 8cm in height.

LOCATION - STRATIGRAPHIC: Rossmore Sandstone Formation

- GEOGRAPHIC: Rossmore Island

PLATE 54

Pisolitic lag. A polished block showing detail of the pisolites. Concentric lamination suggestive of an algal origin is weakly developed or absent. Most of the pisolites have some internal calcite-infilled shrinkage cracks. The lag consists of pisolites and grey siltstone clasts in a sandy siltstone matrix. The block is approximately 15cm wide.

LOCATION - STRATIGRAPHIC: Rossmore Sandstone Formation

- GEOGRAPHIC: Rossmore Island

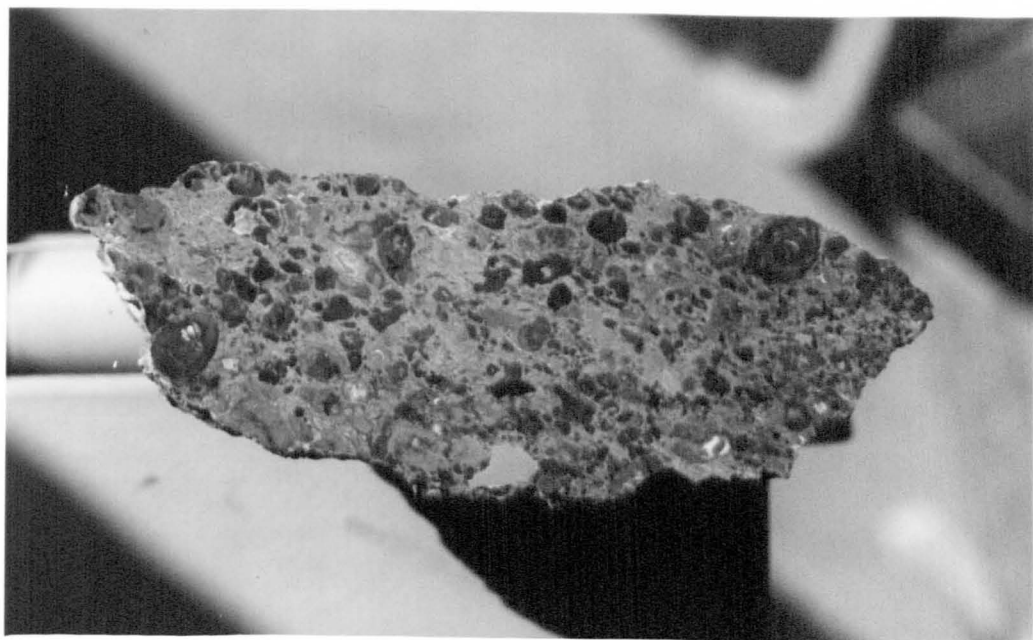
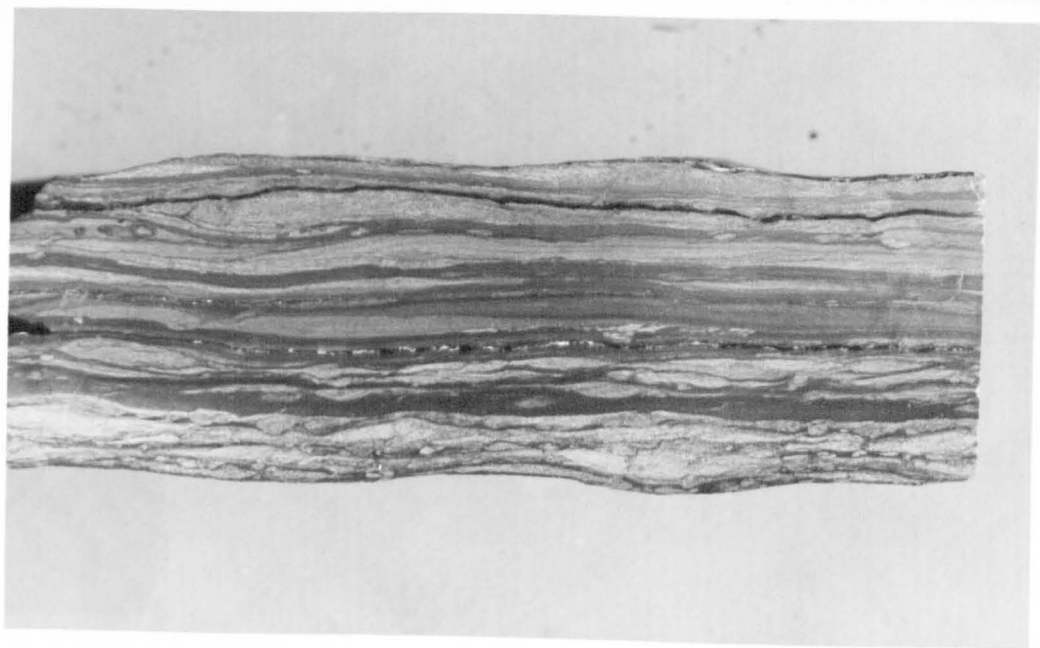


PLATE 55

Fossil fish material. A poorly preserved specimen collected from fish bed number 1. The fine ridged pattern (rather like a fingerprint) on the upper left of the specimen is very similar to that observed on the articular processes of Bothriolepid pectoral appendages (see PLATES 63 to 66). Width of photograph equals approximately 8cm on specimen.

LOCATION - STRATIGRAPHIC: Valentia Slate Formation

- GEOGRAPHIC: Puffin Sound

PLATE 56

Fossil fish material. Indeterminate material collected from fish bed number 1. This is an example of typical appearance and state of preservation for the majority of fish material seen in the Iveragh succession. The fragments are broken and abraded, and have been compressed and realigned to parallel the regional cleavage pattern. Height of photograph equals approximately 15cm on specimen.

LOCATION - STRATIGRAPHIC: Valentia Slate Formation

- GEOGRAPHIC: Puffin Sound



PLATE 57

Fossil fish fragment. This poorly preserved fragment from fish bed number 1 is not positively identified, but appears to be the interior surface of one of the main plates forming the bony head-shield of Bothriolepis. Width of photograph corresponds to approximately 15cm on specimen.

LOCATION - STRATIGRAPHIC: Valentia Slate Formation

- GEOGRAPHIC: Puffin Sound

PLATE 58

Fossil material from fish bed number 7. The fragment is probably of vertebrate (possibly fish) origin, and shows a well-organized internal structure of 'cells' or 'chambers'. Width of photograph equals 5cm on specimen.

LOCATION - STRATIGRAPHIC: Ballinskelligs Sandstone Formation

- GEOGRAPHIC: St. Finan's Bay

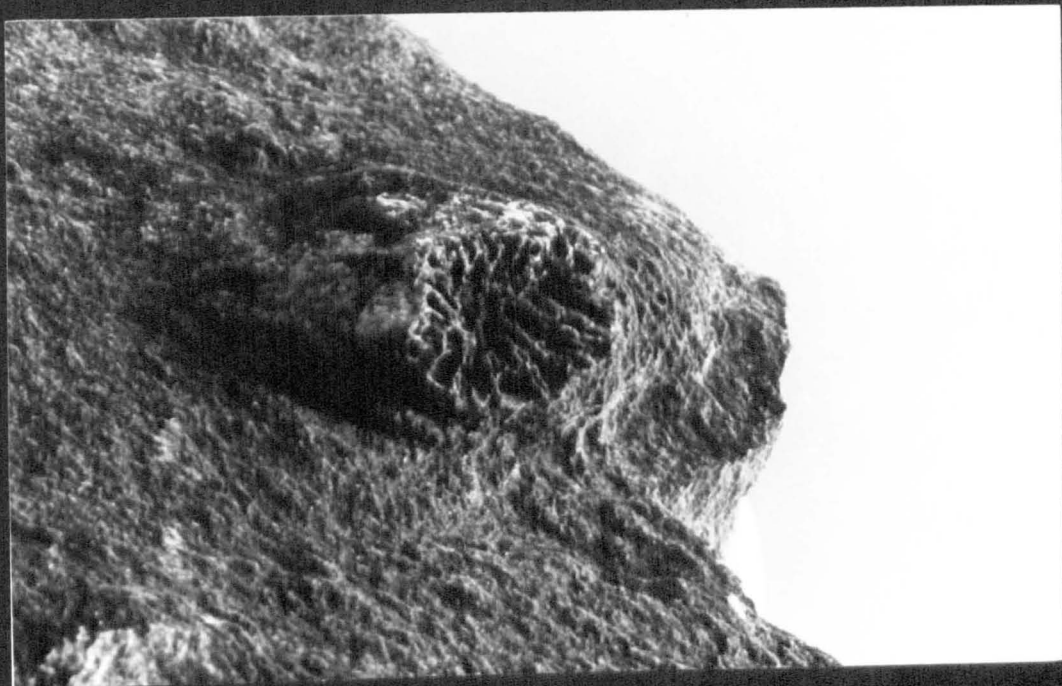
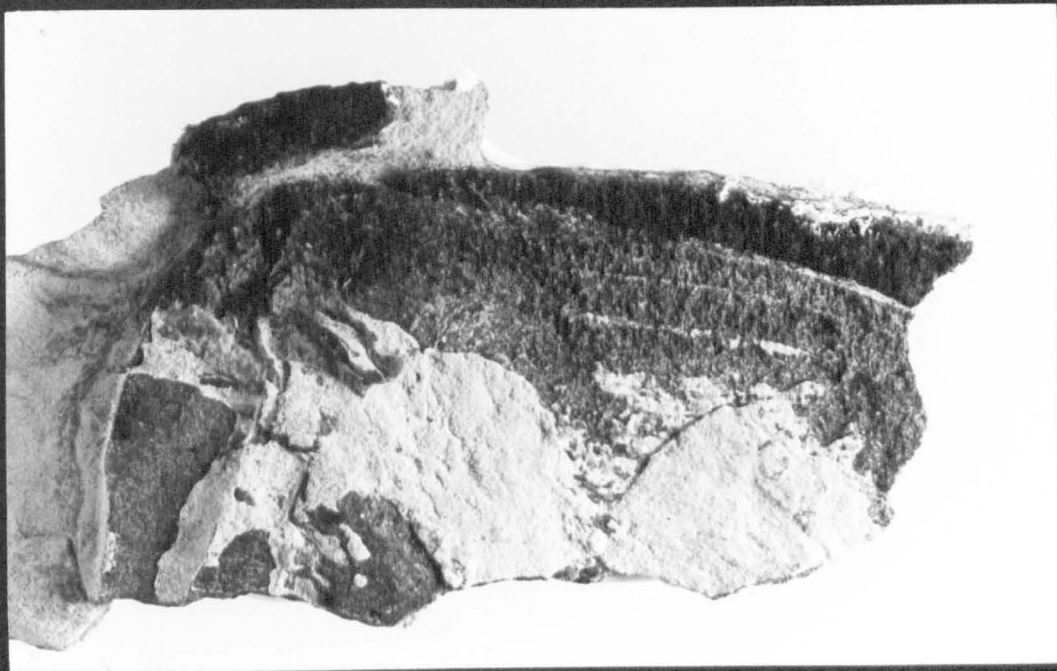


PLATE 59

Fossil fish material. These fragments of bony armour-plates from fish bed number 1 show a well-developed ribbed/tubercular surface ornament. Almost complete plates from the same bed, bearing a similar surface ornament, have been identified as Bothriolepis sp. Height of photograph equals 15cm on specimen.

LOCATION - STRATIGRAPHIC: Valentia Slate Formation

- GEOGRAPHIC: Puffin Sound

PLATE 60

Fossil fish material. Fragments from fish bed number 1. The central fragment with small spine-like processes along the lower left-hand edge is not positively identified, but shows some similarity to the pectoral appendages of Bothriolepis. Width of photograph equals 5cm on specimen.

LOCATION - STRATIGRAPHIC: Valentia Slate Formation

- GEOGRAPHIC: Puffin Sound

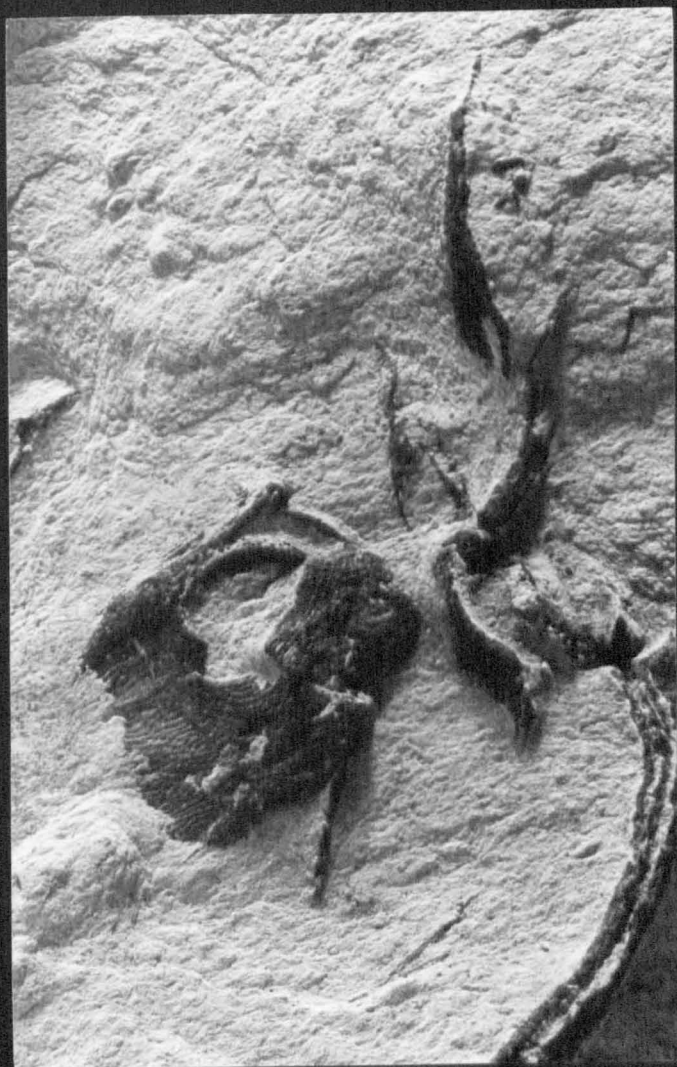


PLATE 61

Fossil fish material. Overlapping premedian and lateral plates from the genus Bothriolepis. The surface ornament is dominantly tubercular. The specimen was collected from fish bed number 1.

Width of photograph corresponds to approximately 8cm on specimen.

LOCATION - STRATIGRAPHIC: Valentia Slate Formation

- GEOGRAPHIC: Puffin Sound

PLATE 62

Fossil fish material. A left lateral plate from the genus Bothriolepis. The surface ornament is dominantly tubercular, with some tubercles fusing to form short ribs. The specimen was collected from fish bed number 1. Height of photograph corresponds to approximately 6cm on specimen.

LOCATION - STRATIGRAPHIC: Valentia Slate Formation

- GEOGRAPHIC: Puffin Sound

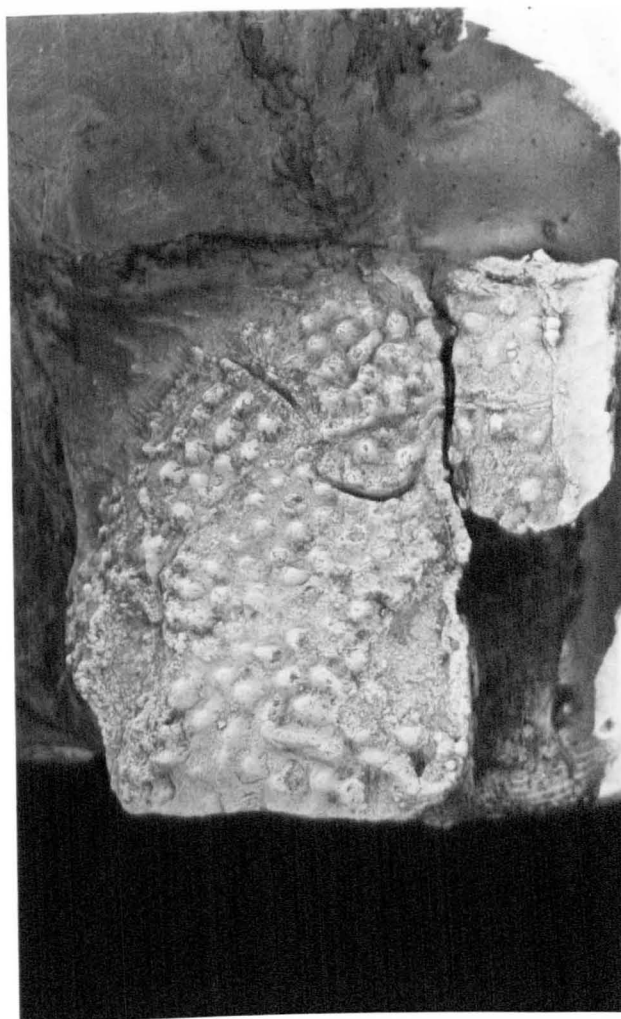


PLATE 63

Fossil fish material. Fine rib-pattern on the articular surface of a pectoral appendage belonging to Bothiolepis. Specimen collected from fish bed number 1. Width of photograph corresponds to approximately 5cm on specimen.

LOCATION - STRATIGRAPHIC: Valentia Slate Formation

- GEOGRAPHIC: Puffin Sound

PLATE 64

As previous plate, showing a further example collected from fish bed number 1. Width of photograph corresponds to approximately 5cm on specimen.

LOCATION - STRATIGRAPHIC: Valentia Slate Formation

- GEOGRAPHIC: Puffin Sound

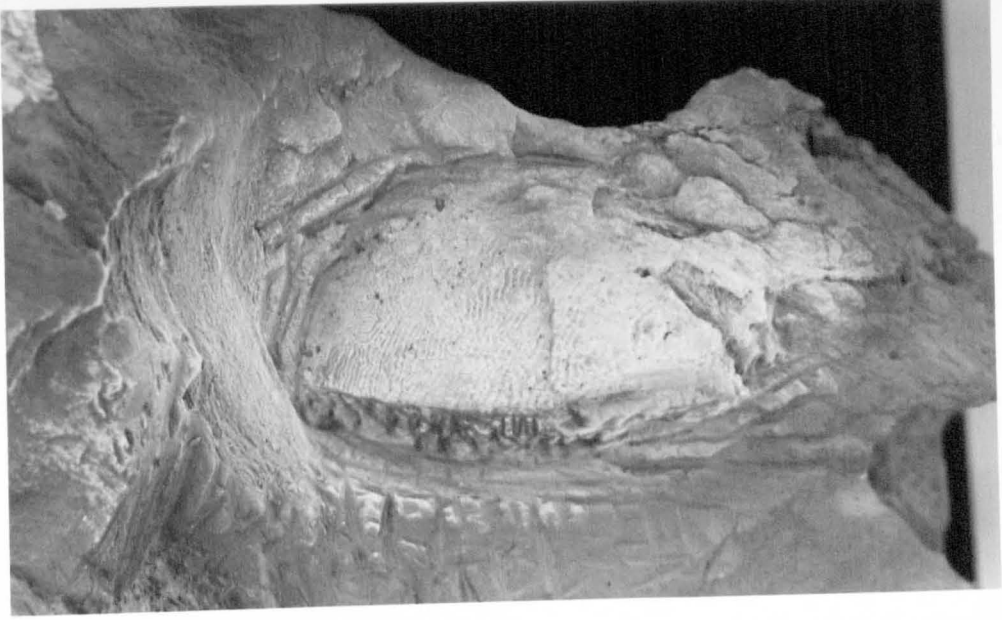


PLATE 65

As previous plate, showing a further example collected from fish bed number 1. Width of photograph corresponds to approximately 5cm on specimen.

LOCATION - STRATIGRAPHIC: Valentia Slate Formation

- GEOGRAPHIC: Puffin Sound

PLATE 66

As previous plate, showing a further example collected from fish bed number 1. Width of photograph corresponds to approximately 5cm on specimen.

LOCATION - STRATIGRAPHIC: Valentia Slate Formation

- GEOGRAPHIC: Puffin Sound



PLATE 67

Fossil fish material. Part of a pectoral appendage from the genus Bothriolepis. This specimen was collected from fish bed number 1. Width of photograph corresponds to approximately 10cm on specimen.

LOCATION - STRATIGRAPHIC: Valentia Slate Formation

- GEOGRAPHIC: Puffin Sound

PLATE 68

Fossil fish material. A fin-spine from the subclass Acanthodii, collected from fish bed number 1. Height of photograph corresponds to approximately 2.5cm on specimen.

LOCATION - STRATIGRAPHIC: Valentia Slate Formation

- GEOGRAPHIC: Puffin Sound

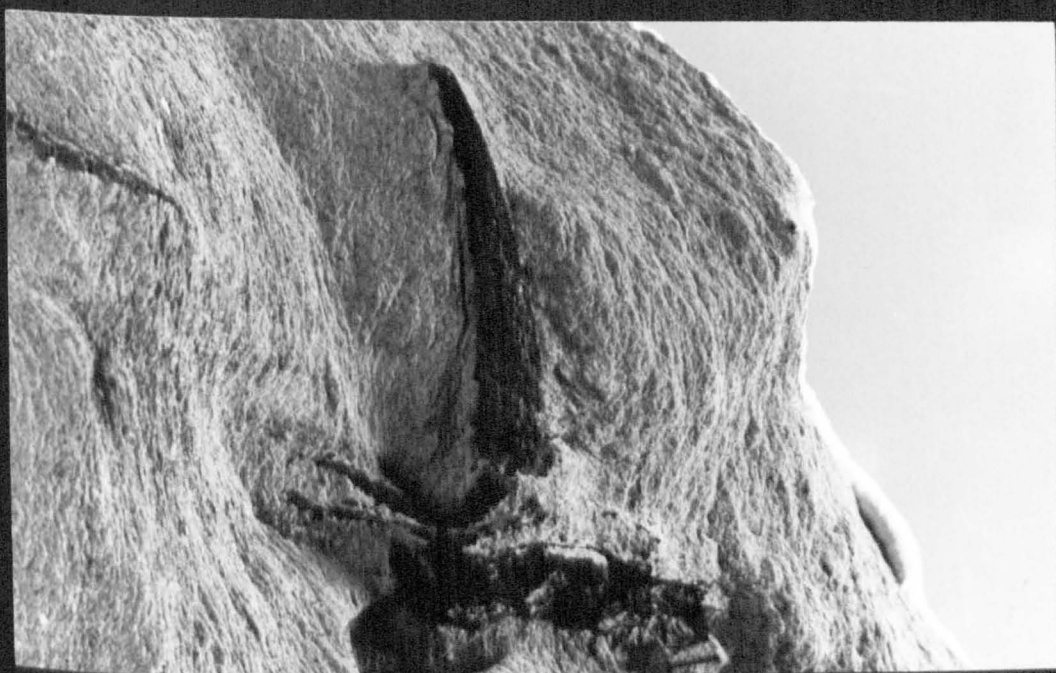
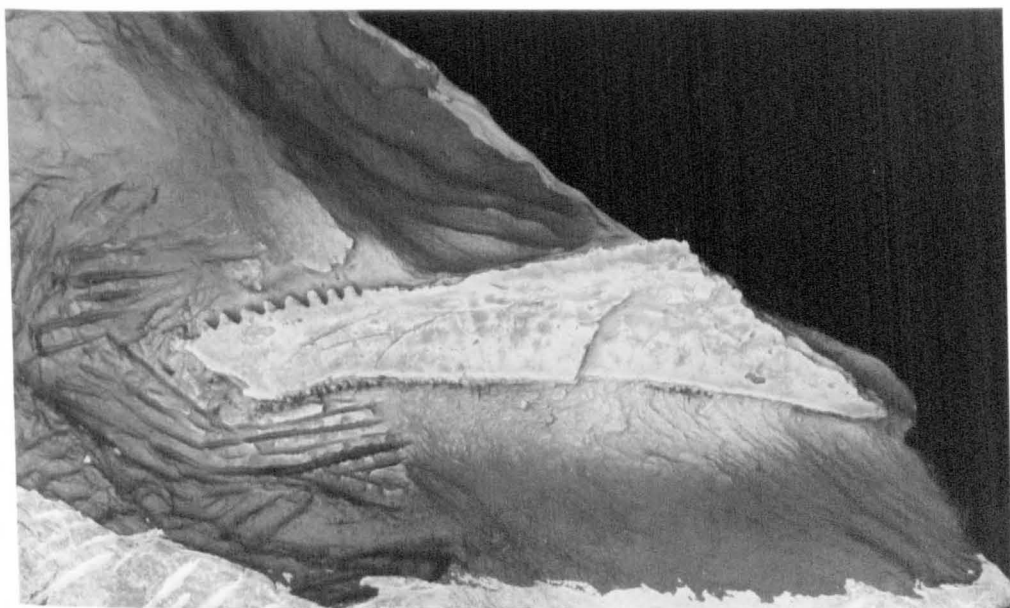


PLATE 69

Fossil fish material. A fish scale from the genus Sauripterus, collected from fish bed number 6. Width of photograph corresponds to approximately 5.5cm on specimen.

LOCATION - STRATIGRAPHIC: St. Finan's Sandstone Formation

- GEOGRAPHIC: St. Finan's Bay

PLATE 70

Fossil fish material. A fragment of bony armour plate exposed on the edge of a block of fine sandstone. The fragment when in situ was part of a thin lag deposit overlying the erosive base of the sandstone. Fracturing has removed the outer ornamented surface of the bony plate, showing the sponge-like cellular appearance of the internal structure. This sponge-like internal structure is fairly typical of the majority of fish fragments collected from the Old Red Sandstone succession on the Iveragh Peninsula. Width of photograph corresponds to 5cm on the specimen.

LOCATION - STRATIGRAPHIC: St. Finan's Sandstone Formation

- GEOGRAPHIC: St. Finan's Bay

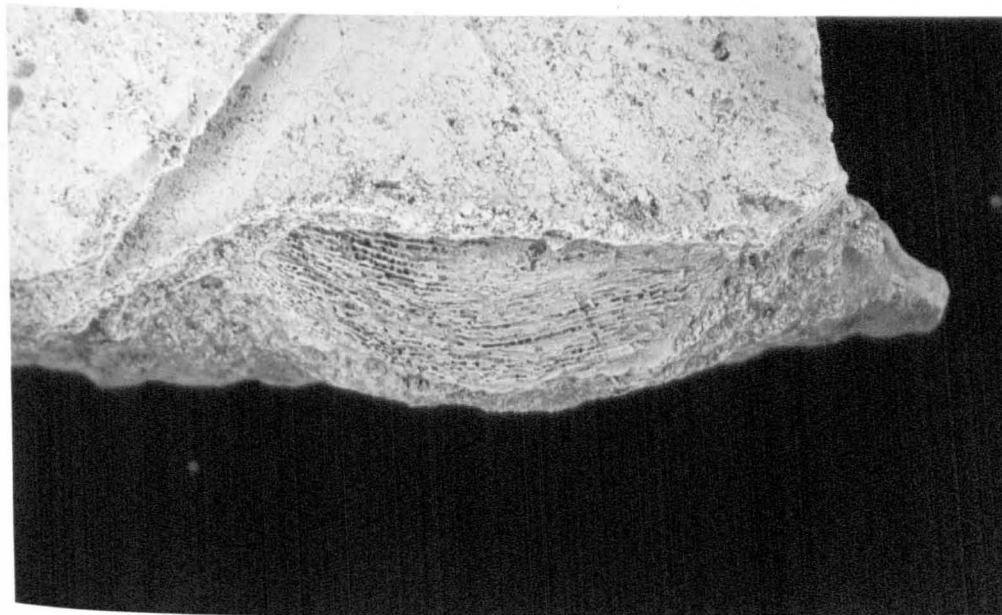


PLATE 71

Fossil fish material. A small fragment from fish bed 6, showing a branching rib ornament passing into lines of fine tubercles to the right. The specimen is attributed to Sauripterus. Width of photograph corresponds to 5cm on the specimen.

LOCATION - STRATIGRAPHIC: St. Finan's Sandstone Formation

- GEOGRAPHIC: St. Finan's Bay

PLATE 72

Fossil fish material. A poorly preserved fragment from fish bed 4, part of a bony armour plate bearing a ribbed/tubercular ornament. Width of photograph corresponds to 10cm on the specimen.

LOCATION - STRATIGRAPHIC: Valentia Slate Formation

- GEOGRAPHIC: St. Finan's Bay

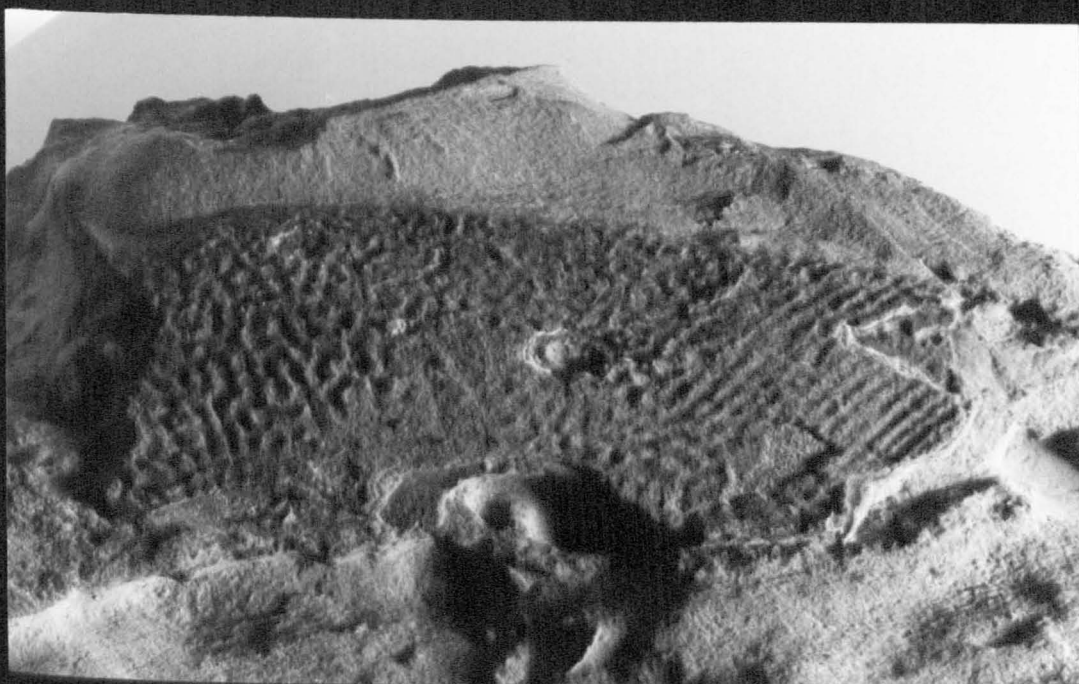
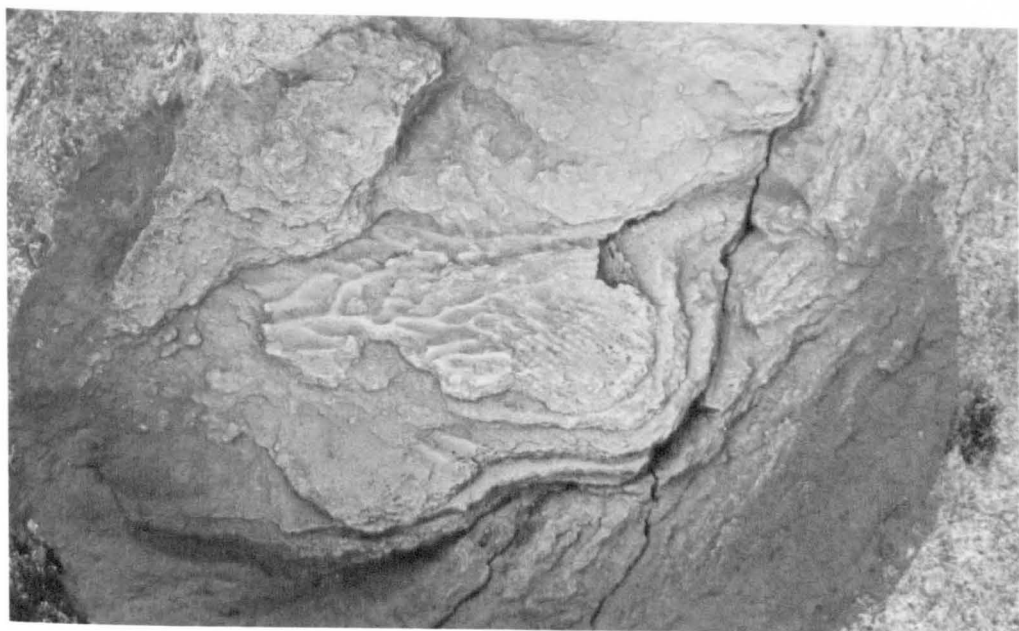


PLATE 73

Fossil fish material. A fragment from fish bed number 7. The material is not positively identified but shows a well developed branching rib ornament. Width of photograph corresponds to 6cm on the specimen.

LOCATION - STRATIGRAPHIC: St. Finan's Sandstone Formation

- GEOGRAPHIC: St. Finan's Bay

PLATE 74

Fossil fish material. A fragment from fish bed number 7. The fragment shows a similar branching rib ornament to that in the previous plate, but tending to break down into a slightly tubercular pattern in places. Width of photograph corresponds to 4cm on the specimen.

LOCATION - STRATIGRAPHIC: St. Finan's Sandstone Formation

- GEOGRAPHIC: St. Finan's Bay



PLATE 75

Fossil fish material. A rather abraded specimen from fish bed number 7, showing a ribbed/tubercular ornamentation on a piece of bony armour plate. Width of photograph corresponds to 6cm on the specimen.

LOCATION - STRATIGRAPHIC: Ballinskelligs Sandstone Formation.

- GEOGRAPHIC: St. Finan's Bay

PLATE 76

Fossil fish material. A small fragment of bony armour plate from fish bed number 7, showing the external tubercular ornament. The honeycomb internal structure of the bone can be seen along the edges where the fragment has been fractured. Width of photograph corresponds to 8cm on the specimen.

LOCATION - STRATIGRAPHIC: Ballinskelligs Sandstone Formation

- GEOGRAPHIC: St. Finan's Bay

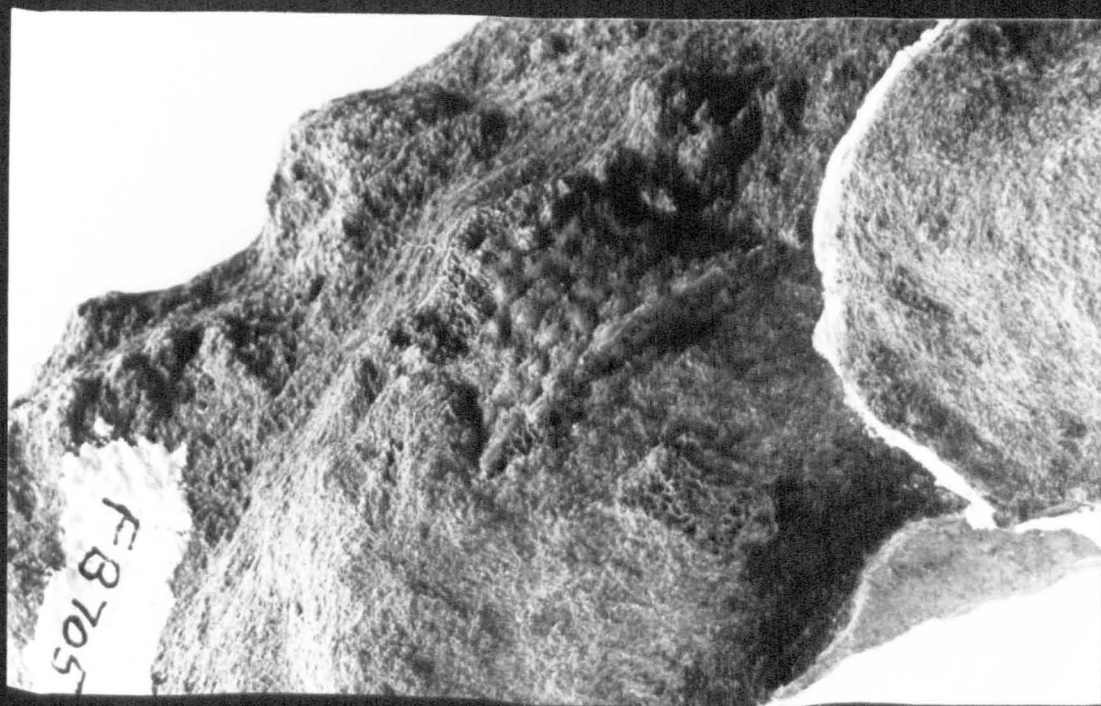


PLATE 77

Fossil plant stem. A block broken off an outcrop of grey quartzitic sandstone facies revealed a fragment of plant stem over 30cm long. The left-hand end appears to branch, and towards the right-hand end two thin stubs are seen branching off on opposite sides of the main stem. The plant material is preserved as a thin film of carbon lining the mould, and bears a faint ribbed or slightly reticulate pattern. Hammer for scale.

LOCATION - STRATIGRAPHIC: Rossmore Sandstone Formation

- GEOGRAPHIC: Coastal exposure just E. of Tahilla river
mouth

PLATE 78

Small burrow traces in sand-laminated siltstone facies. The burrows are 1-2mm wide, and appear to be non-branching. Orientation varies from horizontal to vertical with a slight preference for sub-vertical. Sharply curved changes in orientation are fairly common. Scale is given by 10p piece (= 3cm diameter).

LOCATION - STRATIGRAPHIC: Valentia Slate Formation

- GEOGRAPHIC: N. of Keel Strand

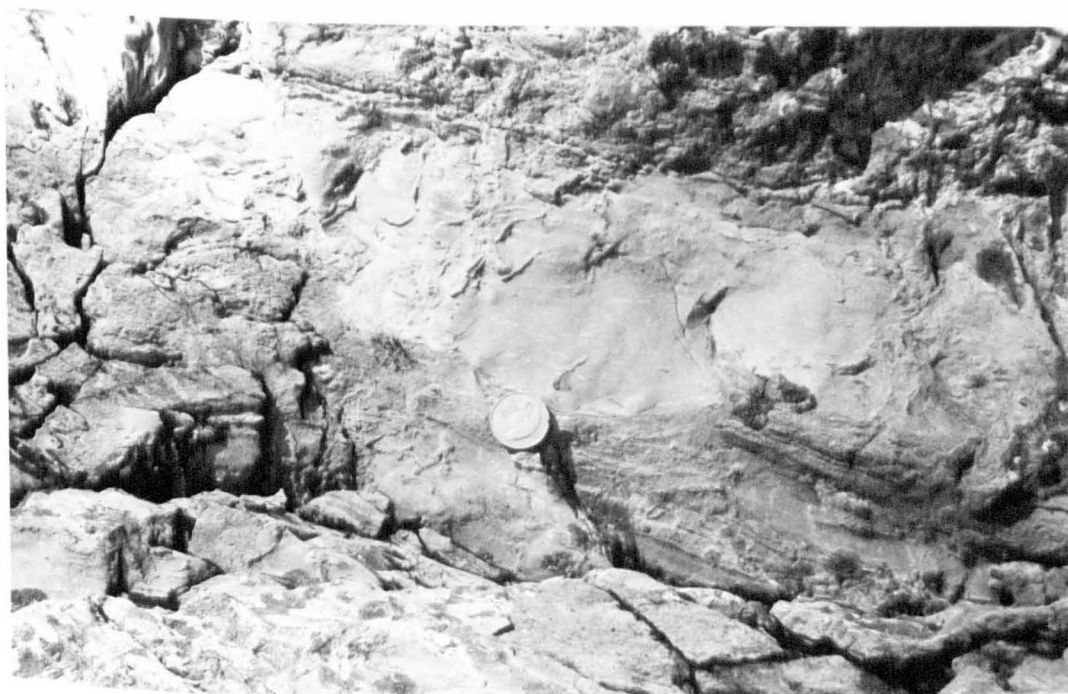


PLATE 79

Burrow traces in sand-laminated siltstone facies, exposed on a joint-plane surface normal to bedding. Two sizes of burrow traces are present, simple tubes 1-2mm in diameter such as the one immediately to the left of the tape, and a broader (3-5mm) burrow trace above and slightly to the right of the tape. The latter has a faint surface pattern of sinuous and interwoven fine ridges which run more or less parallel to the length of the burrow trace.

LOCATION - STRATIGRAPHIC: St. Finan's Sandstone Formation

- GEOGRAPHIC: St. Finan's Bay

PLATE 80

Burrow traces on a bedding plane surface. The traces are exposed on the upper surface of a silty very fine sandstone bed, in sand-laminated siltstone facies. The surface is crossed by a number of what appears to be crawling trails, but since they have positive relief on top of a bedding plane are interpreted as horizontal burrows, possibly formed just below the sediment surface. In the upper right of the photograph, many traces appear to intersect in a radiating pattern. The centre of intersection is a small raised knob of sandstone, apparently the surface expression (termination?) of a vertical burrow shaft. Pentax lens cap (= 5cm in diameter) indicates scale.

LOCATION - STRATIGRAPHIC: St. Finan's Sandstone Formation

- GEOGRAPHIC: St. Finan's Bay

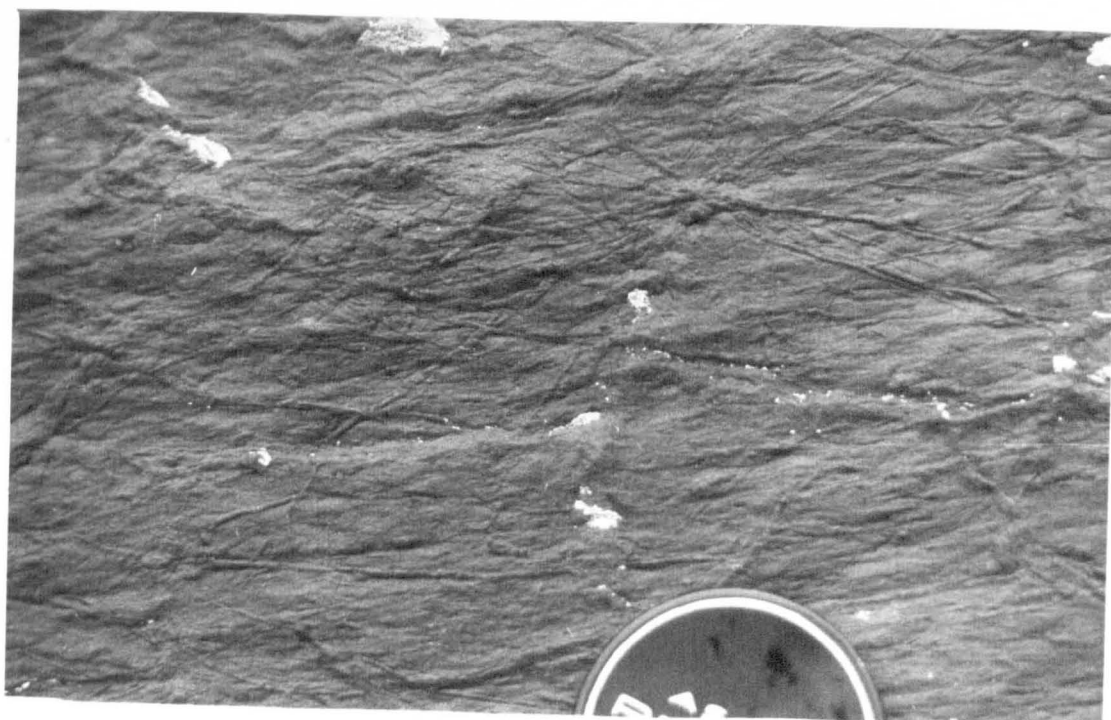


PLATE 81

Isopodichnus crawling trails. The photograph shows a cast prepared from a latex peel made in the field. The traces in situ consist of a number of straight or gently curved trails which are visible as positive relief on the underside of a very fine sandstone bed. These features are presumed to reflect original negative relief 'furrows' excavated on the surface of the underlying siltstone, now infilled and preserved by the succeeding sandstone. The trails are 2-3mm wide, with a distinct median groove. Trail length varies from short isolated 3-4mm traces to continuous trails 2-3cm long. A continuous trail in the centre of the photograph becomes discontinuous towards the lower right; suggesting the organism creating it was partly swimming, partly crawling, and thus only periodically in contact with the sediment surface. Width of photograph corresponds to 15cm on specimen.

LOCATION - STRATIGRAPHIC: St. Finan's Sandstone Formation

- GEOGRAPHIC: St. Finan's Bay

PLATE 82

Isopodichnus crawling trails. Photograph of another area on the surface of the cast described above, showing similar small bilobed crawling trails.

LOCATION - STRATIGRAPHIC: St. Finan's Sandstone Formation

- GEOGRAPHIC: St. Finan's Bay



PLATE 83

Beaconites burrow in rippled and laminated silty very fine sandstone. The burrow is exposed on a joint plane surface normal to bedding. The burrow is at least 20cm long, and approximately 2cm in diameter. The only internal texture is a very fine mottling. Note slight curvature to the right in the upper part of the burrow.

LOCATION - STRATIGRAPHIC: St. Finan's Sandstone Formation

- GEOGRAPHIC: St. Finan's Bay

PLATE 84

Beaconites burrow in sand-laminated siltstone facies. The burrow is exposed on a joint plane surface normal to bedding. The burrow extends from the pencil (lower right) to the acid bottle (upper left). A smaller parallel burrow trace extends upwards from the small plastic container (lower left). The main burrow trace is over 60cm long and 2cm wide, with similar internal mottled texture to the burrow seen in PLATE 83. The burrow cuts bedding sub-horizontally, and shows slight changes in the angle of orientation along its length.

LOCATION - STRATIGRAPHIC: St. Finan's Sandstone Formation

- GEOGRAPHIC: St. Finan's Bay

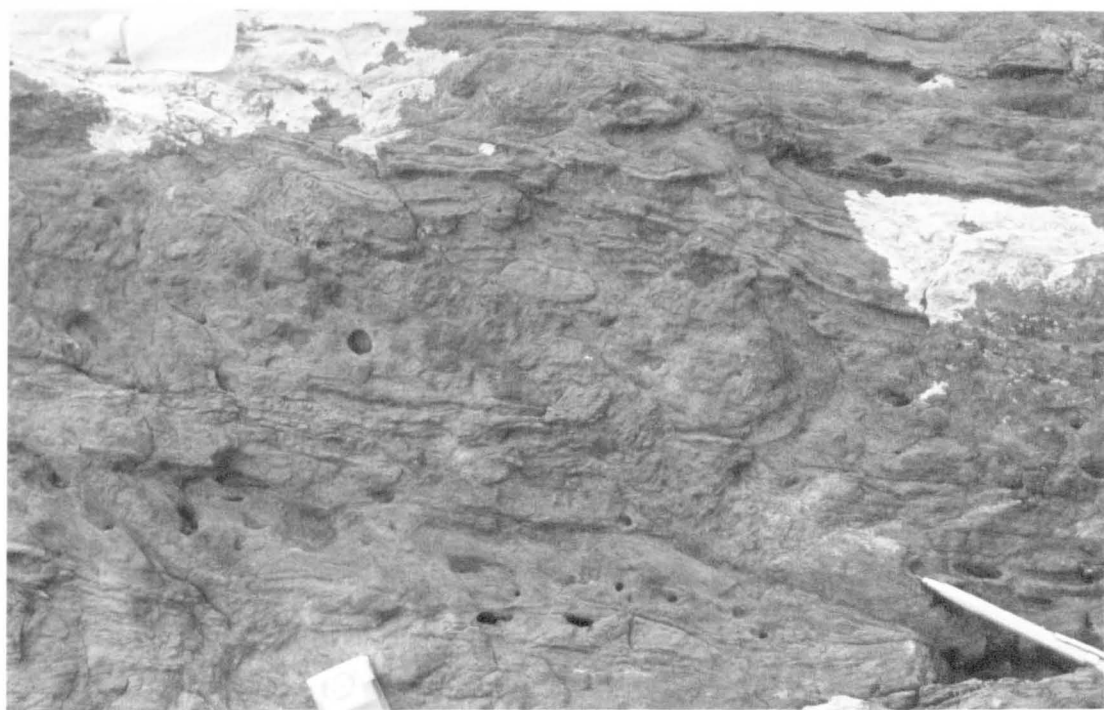


PLATE 85

Sand-infilled Beaconites burrow trace in a silty very fine sandstone matrix. Weathering has differentially eroded the silty sandstone so that the burrow trace projects above a former bedding plane surface. The enclosing sediments are part of a trough cross-bedded set 15cm thick. The burrow trace is almost circular in cross section, with a diameter of 1.5cm. The burrow is sub-vertical in relation to the top of the cross-bedded set.

LOCATION - STRATIGRAPHIC: St. Finan's Sandstone Formation

- GEOGRAPHIC: St. Finan's Bay

PLATE 86

Bioturbated patch in rippled and laminated coarse siltstone. The irregular outlines of the patch have been emphasised with chalk. Note the truncation of faint ripple-bedding in the enclosing sediments. Fifty pence piece (= 3cm in diameter) gives scale. The interior of the patch is texturally mottled but of similar grain size to the rippled and laminated beds.

LOCATION - STRATIGRAPHIC: Valentia Slate Formation

- GEOGRAPHIC: Valentia Island

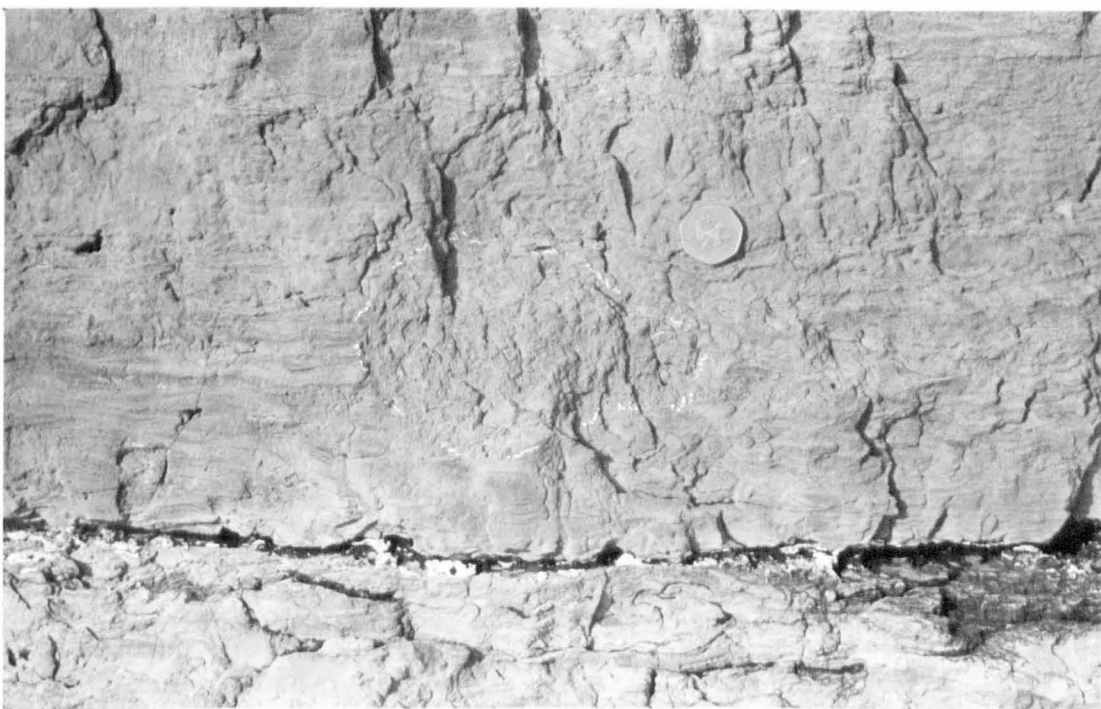
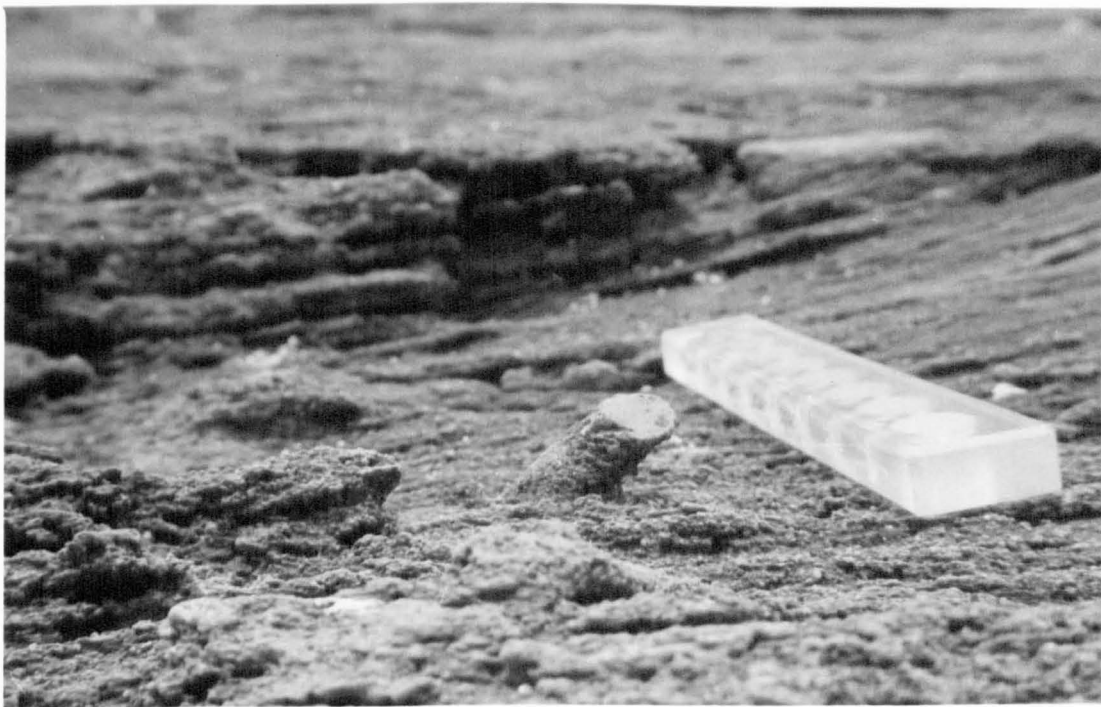


PLATE 87

Columnar jointing in the gabbro sill on Beginish Island. Hammer for scale.

LOCATION - STRATIGRAPHIC: Iveragh Group

- GEOGRAPHIC: Beginish Is., Valentia Harbour

PLATE 88

Thin-section photomicrograph of gabbro from the sill on Beginish Island. Crossed-polars.

LOCATION - STRATIGRAPHIC: Iveragh Group

- GEOGRAPHIC: Beginish Is., Valentia Harbour

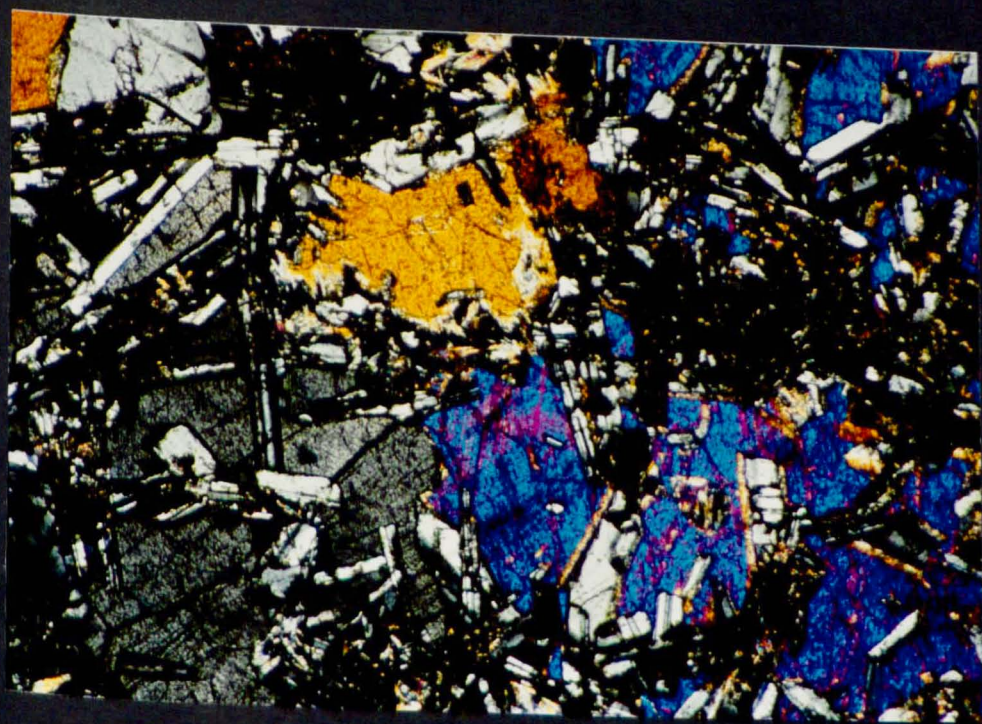


PLATE 89

The Keel Tuff Bed. The light coloured bed in the upper part of the photograph is a tuff bed 6.3m thick. The base rests abruptly, but conformably, on top of the underlying sediments, while the top passes gradationally up into the overlying sediments.

LOCATION - STRATIGRAPHIC: Valentia Slate Formation

- GEOGRAPHIC: Atlantic Coast section, north of Keel Strnd

PLATE 90

The Keel Tuff Bed. Hand specimens from near the base of the bed. Circled areas are lithic fragments, small dark spots are crystals of quartz, feldspar and haematite. Half-pence coin for scale.

LOCATION - STRATIGRAPHIC: Valentia Slate Formation

- GEOGRAPHIC: Atlantic Coast section, north of Keel Strand

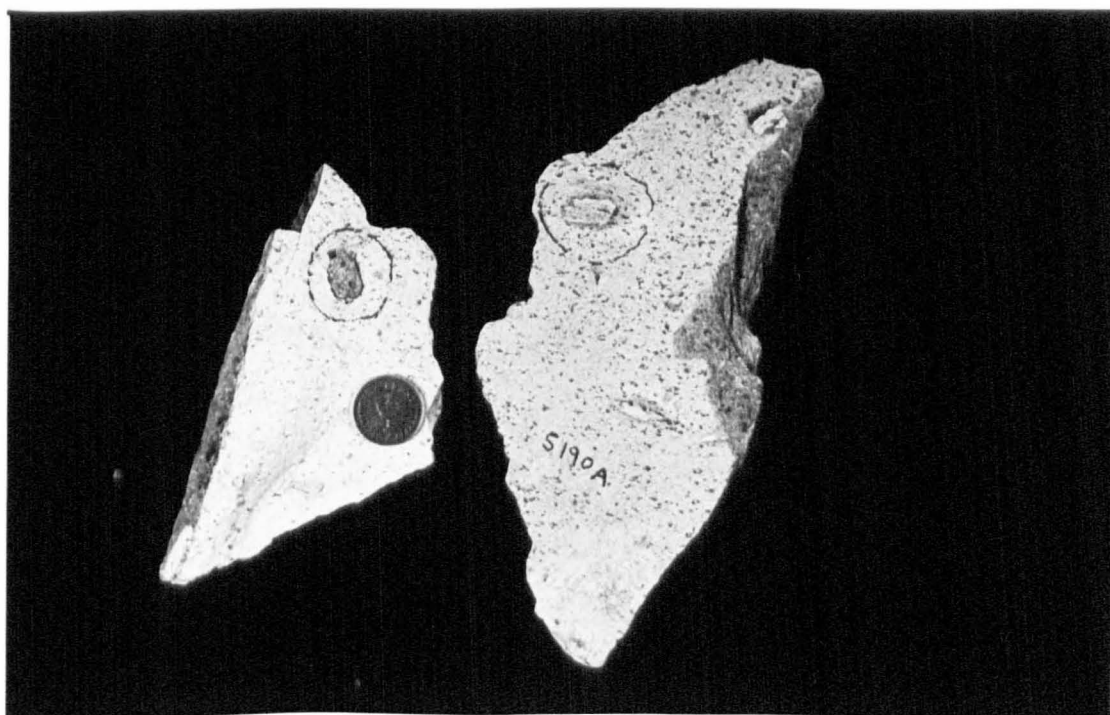


PLATE 91

The Keel Tuff Bed. A thin-section photomicrograph shows shards in a glassy matrix. Plane-polarised light. The shards are preserved in places as recognisable though incomplete bubble walls. A shard to the right of centre preserves the tricusate junction between three bubbles. The regional cleavage fabric is visible as faint dark lines crossing the photograph horizontally.

LOCATION - STRATIGRAPHIC: Valentia Slate Formation

- GEOGRAPHIC: Atlantic Coast section, north of Keel Strand

PLATE 92

The Keel Tuff Bed. A thin-section photomicrograph from the same thin-section as PLATE 91. Plane-polarised light. Numerous bicusate and tricusate shards are visible, as well as a near-complete bubble outline in the centre of the photograph.

LOCATION - STRATIGRAPHIC: Valentia Slate Formation

- GEOGRAPHIC: Atlantic Coast section, north of Keel Strand

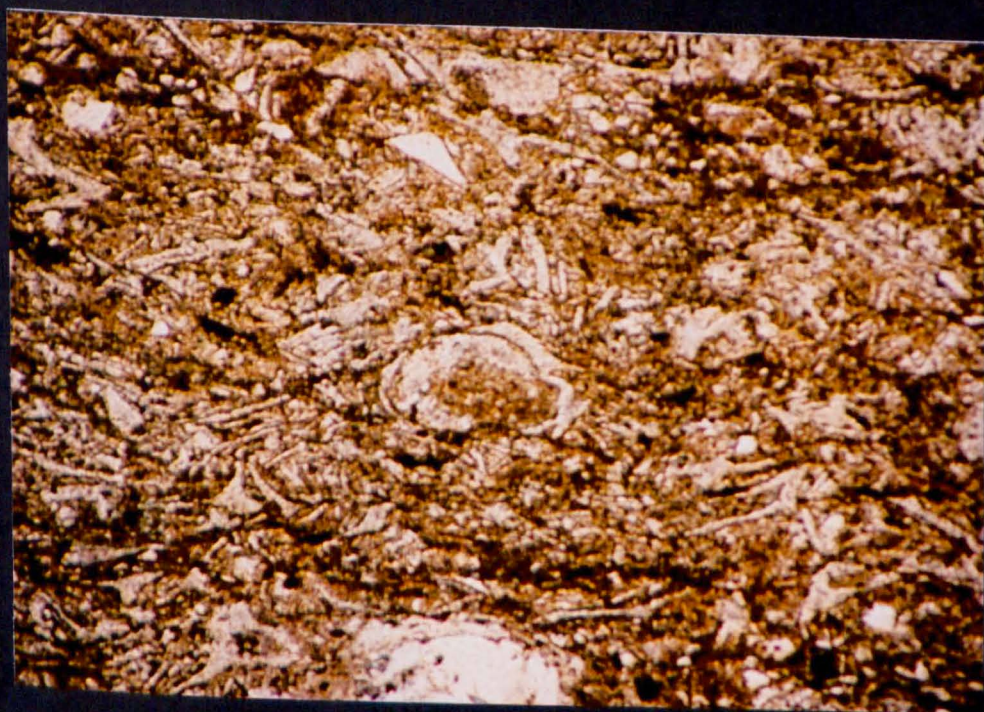


PLATE 92

Dyke intrusion. The photograph shows a dyke exposed in a small vertical cliff-section. The dyke runs from lower left to top right, cutting across horizontal bedding in the sediments. Scale is given by the geological hammer to the right of centre.

LOCATION - STRATIGRAPHIC: Iveragh Group

- GEOGRAPHIC: Fort Point, Valentia Island

PLATE 94

Dyke intrusion. The compass clinometer rests on the chilled margin of the dyke, while the rocks immediately to the left are fine-grained sedimentary rocks. The contact between the two rock types is an oblique line crossing the centre of the photograph from lower left to top right. The regional cleavage cuts the rocks obliquely from top left to lower right, and is clearly continued into the chilled intrusive rocks.

LOCATION - STRATIGRAPHIC: Iveragh Group

- GEOGRAPHIC: Lamb's Head

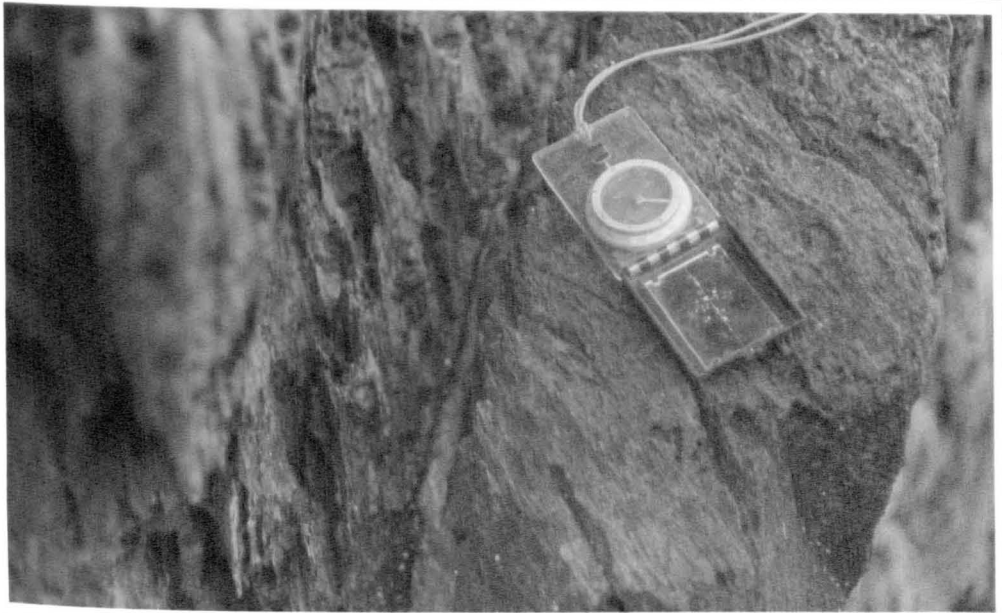


PLATE 95

Dyke intrusion. Thin section photomicrograph of a sample from the dyke shown in PLATE 94. Plane polarised light. A horizontal fabric picked out by flattened chlorite-filled vesicles, oriented feldspar phenocrysts and faint hairline fractures is the regional cleavage fabric.

LOCATION - STRATIGRAPHIC: Iveragh Group

- GEOGRAPHIC: Lamb's Head

PLATE 96

Dyke intrusion. The same view as the previous plate.

Crossed-polars.

LOCATION - STRATIGRAPHIC: Iveragh Group

- GEOGRAPHIC: Lamb's Head

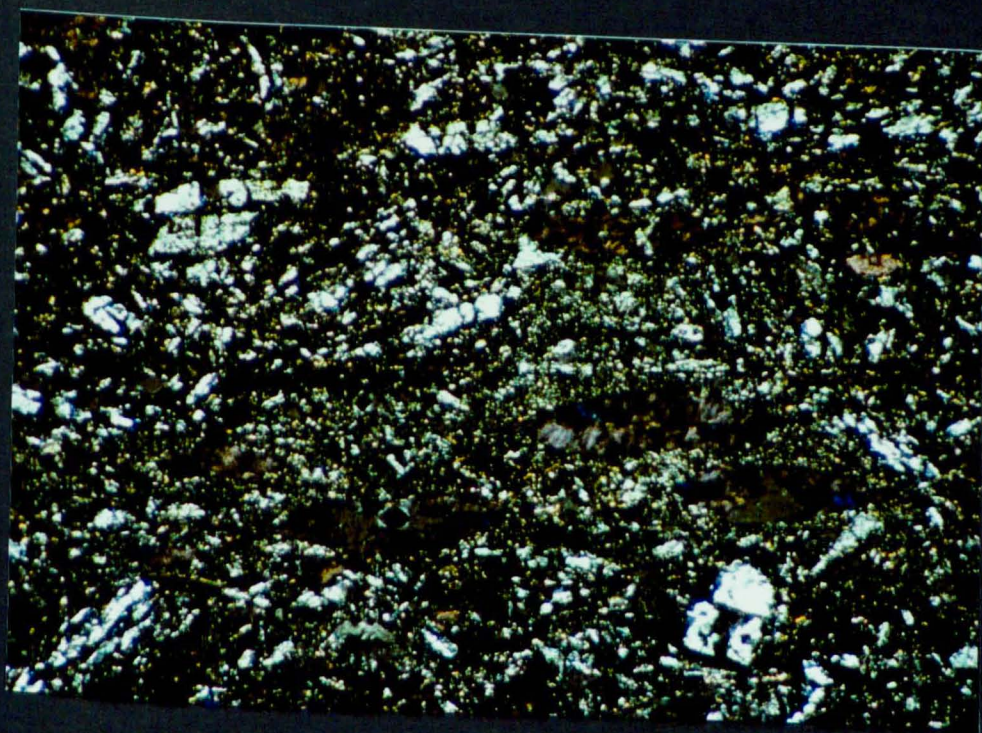
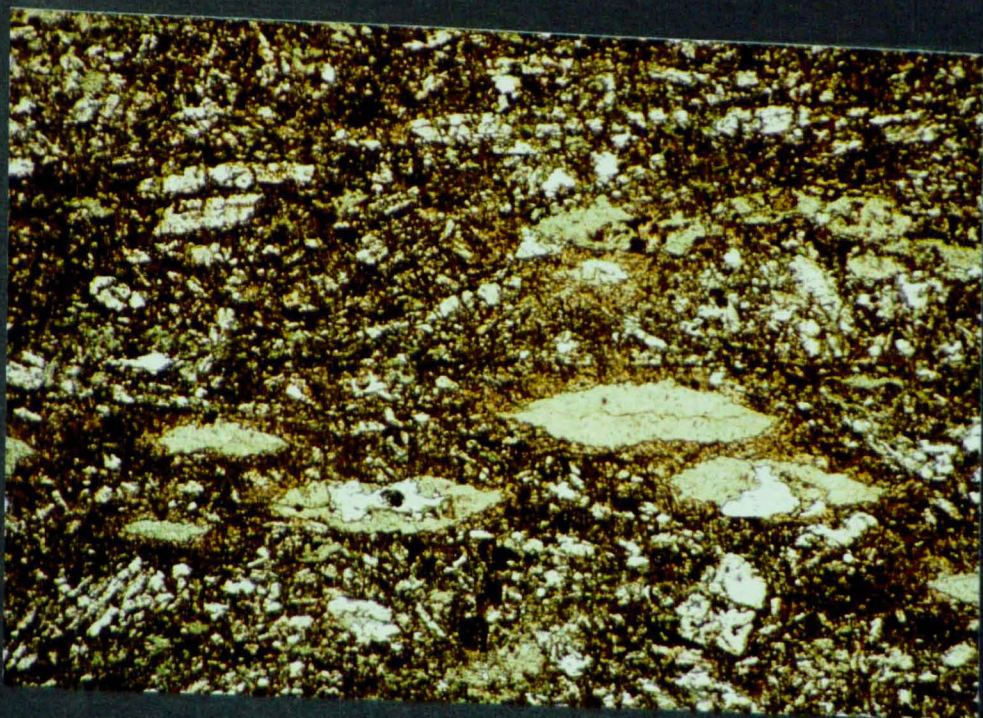


PLATE 97

Agglomerage. Large rounded blocks of fine-grained basic igneous rock, contained in a cleaved and highly greenish-coloured matrix. Hand-lens for scale.

LOCATION - STRATIGRAPHIC: Iveragh Group

- GEOGRAPHIC: Bealtra Bay, Valentia Harbour

PLATE 98

Agglomerate. Two blocks of igneous material, collected from the agglomerate. The blocks are strongly vesicular, with holes up to 5mm in diameter. Ruler marked in cm. gives scale.

LOCATION - STRATIGRAPHIC: Iveragh Group

- GEOGRAPHIC: Bealtra Bay, Valentia Harbour

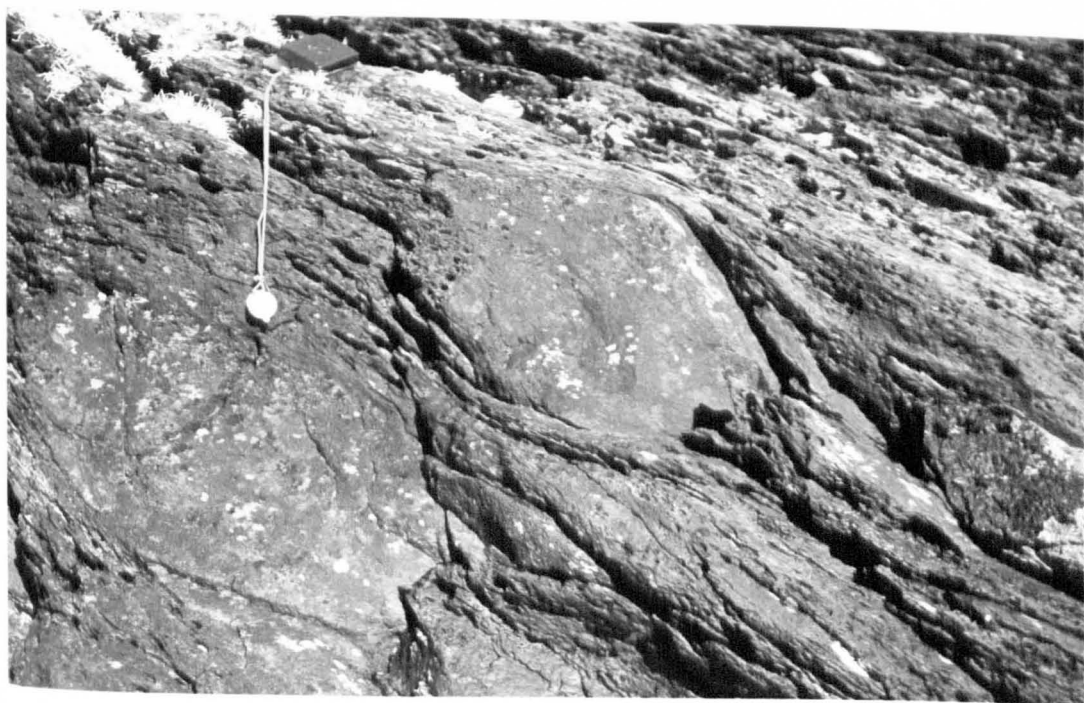


PLATE 99

Agglomerate. Photograph of a wave-polished section of the agglomerate, with hammer-handle for scale. The agglomerate here contains numerous smaller rounded clasts of ashy, igneous and sedimentary material.

LOCATION - STRATIGRAPHIC: Iveragh Group

- GEOGRAPHIC: Bealtra Bay, Valentia Harbour

PLATE 100

Agglomerate. Photograph of highly altered agglomerate. The matrix is fine-grained, cleaved, green coloured rock, while the clasts are epidotised and are pale yellowish-green in colour with a flinty 'baked' appearance.

LOCATION - STRATIGRAPHIC: Iveragh Group

- GEOGRAPHIC: Ballycarbery, Valentia Harbour

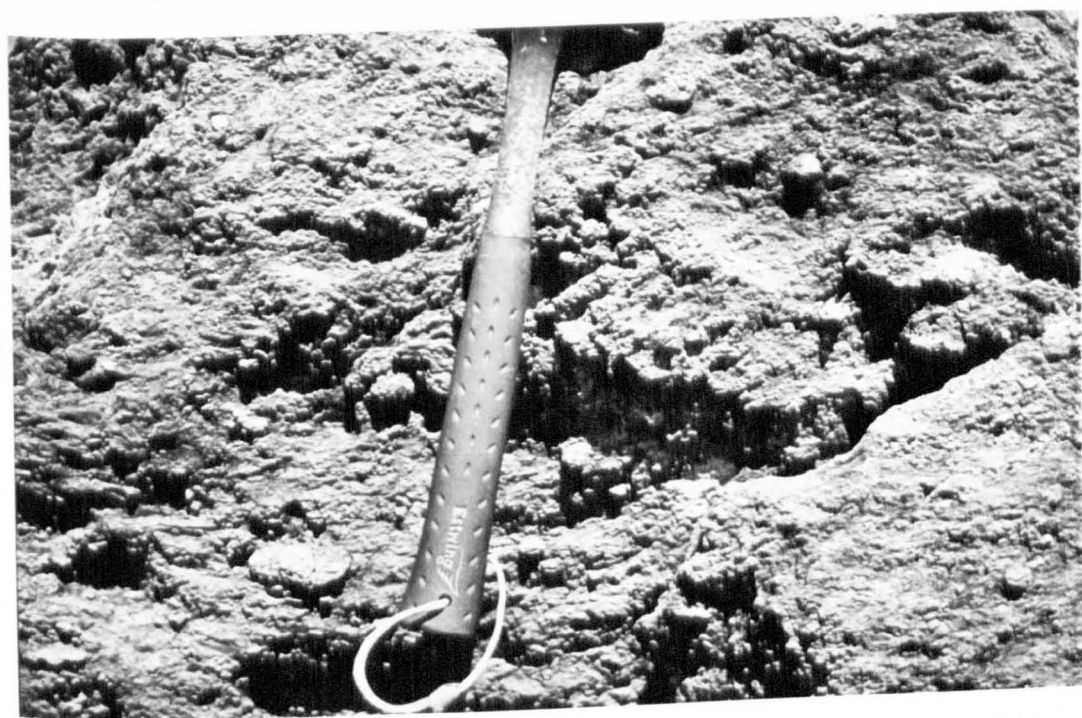
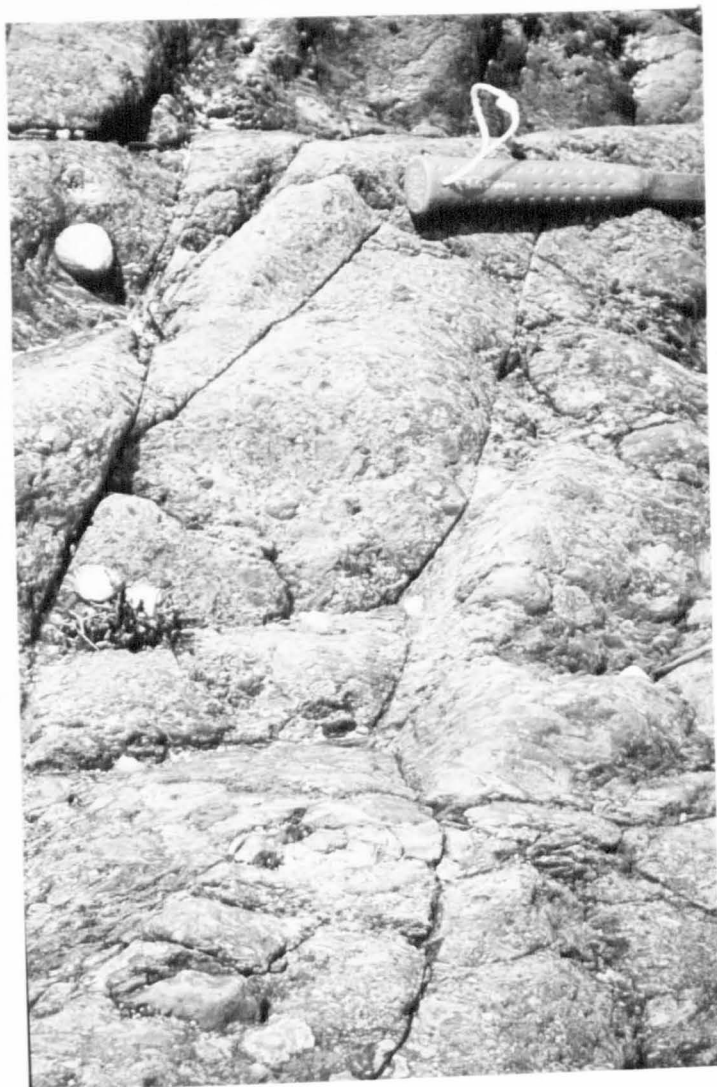


PLATE 101

Sill intrusion. Thin-section photomicrograph of a sample from the top of the sill intrusion on the shore of Valentia Harbour, where it contains thin beds and fragments of baked sedimentary rock.

Crossed-polars. The photograph shows globules of epidote and clusters of fine epidote crystals formed by contact metamorphic alteration in the sedimentary rocks.

LOCATION - STRATIGRAPHIC: Iveragh Group

- GEOGRAPHIC: Bealtra Bay, Valentia Harbour

PLATE 102

Sill intrusion. Thin-section photomicrograph from the same sample shown in the previous plate. Crossed-polars. Extreme epidotisation of sedimentary rock fragments has formed large clusters of radiating epidote crystals within the baked sediments.

LOCATION - STRATIGRAPHIC: Iveragh Group

- GEOGRAPHIC: Bealtra Bay, Valentia Harbour

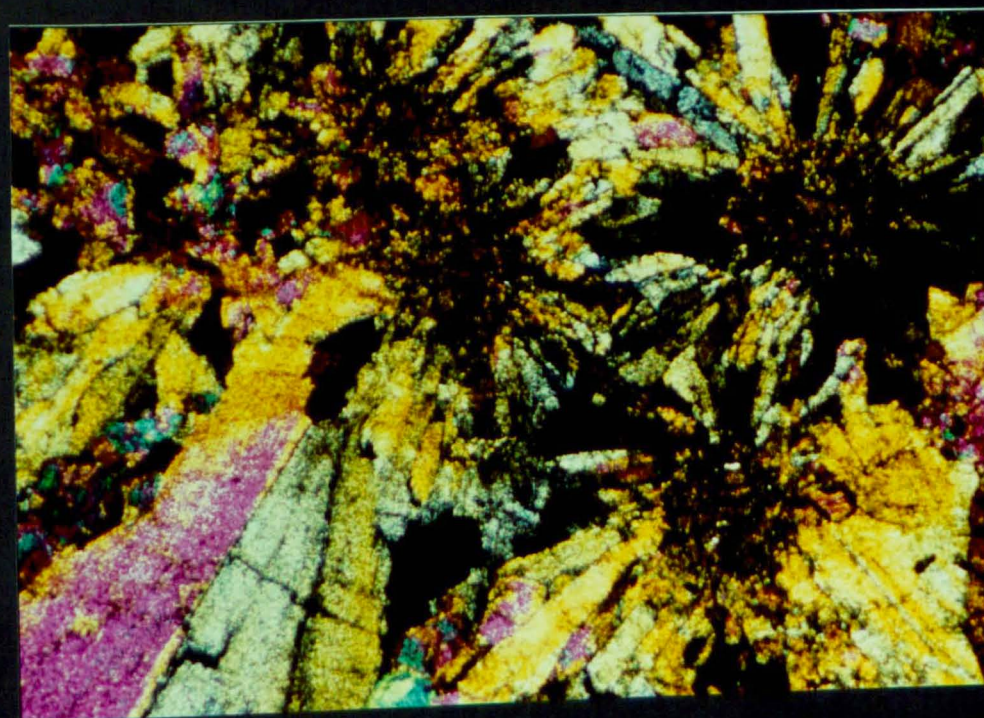
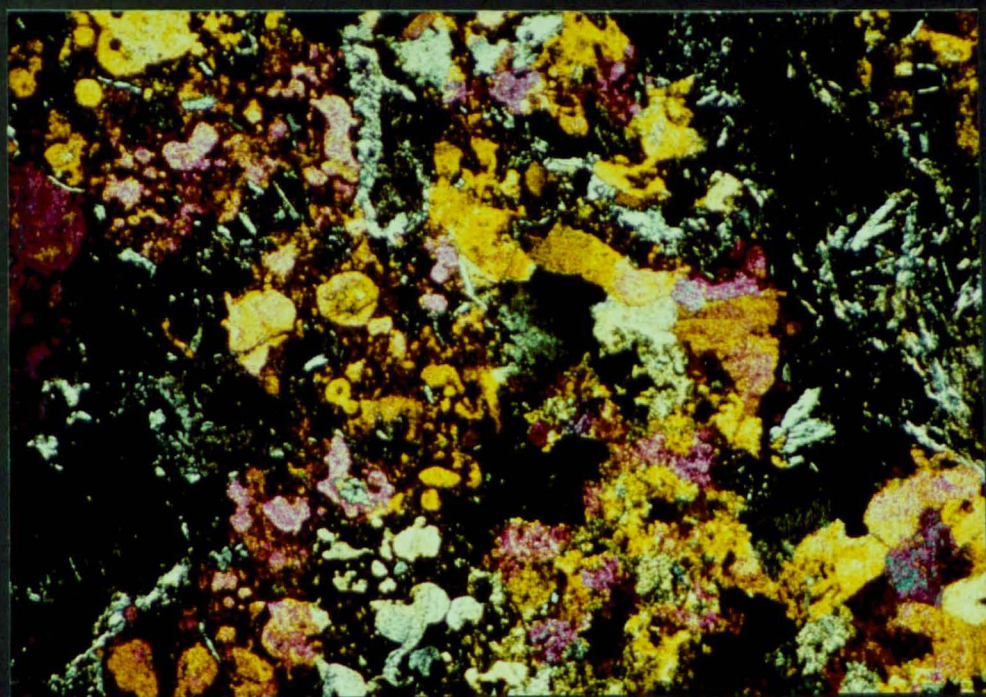


PLATE 103

Folding. Chevron style folding in thinly interbedded sandstones and siltstones. A hammer handle (30cm in length) is visible in the core of the anticline on the left.

LOCATION - STRATIGRAPHIC: Rossmore Sandstone Formation

- GEOGRAPHIC: Rossmore Island

PLATE 104

Folding. The axis of a moderately sized anticline plunges gently away from the camera. Bedding is closely folded in the lower part of the photograph, becoming gently folded towards the upper part of the photograph.

LOCATION - STRATIGRAPHIC: Bellinskelligs Sandstone Formation

- GEOGRAPHIC: Bolus Head

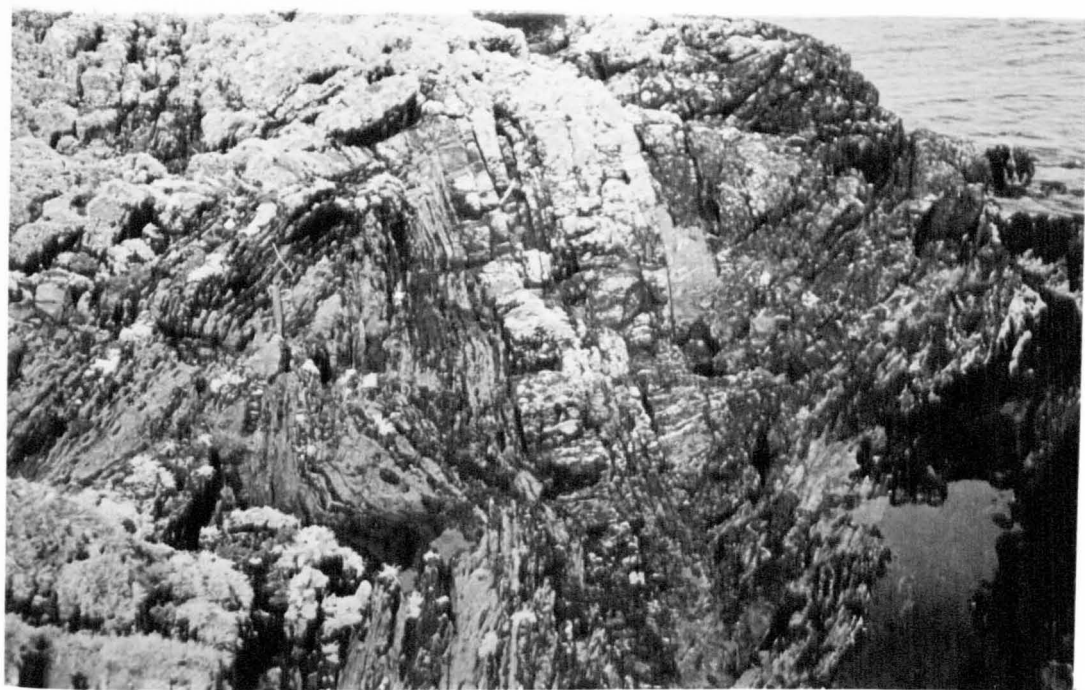


PLATE 105

Folding. An example of disharmonic folding in interbedded siltstone and fine sandstone. The lower beds are folded in a small syncline/anticline while bedding at the top is near horizontal. Different fold-styles are accommodated by deformation in the siltstone. The outcrop is approximately 2m in height.

LOCATION - STRATIGRAPHIC: Purple Sandstone Formation

- GEOGRAPHIC: Sneem River

PLATE 106

Folding. A close-up view of the folds in the right-hand area of the previous plate. Cleavage is in the general sense axial planar to the folding, but is divergent in the sandstones and convergent in the siltstones.

LOCATION - STRATIGRAPHIC: Purple Sandstone Formation

- GEOGRAPHIC: Sneem River

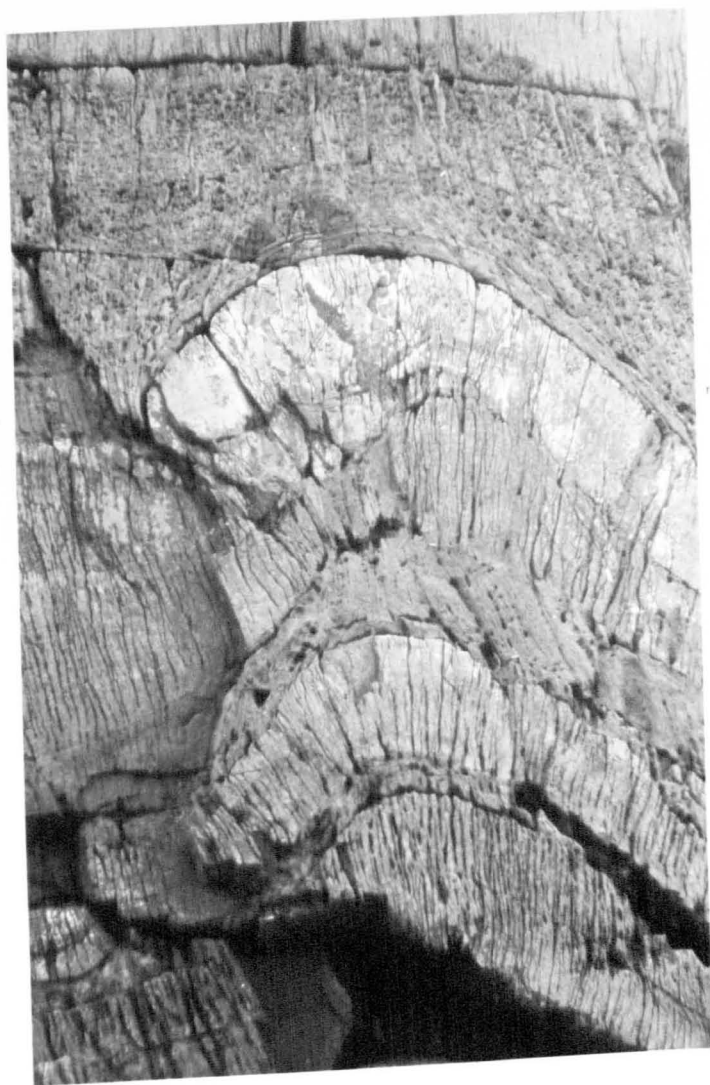
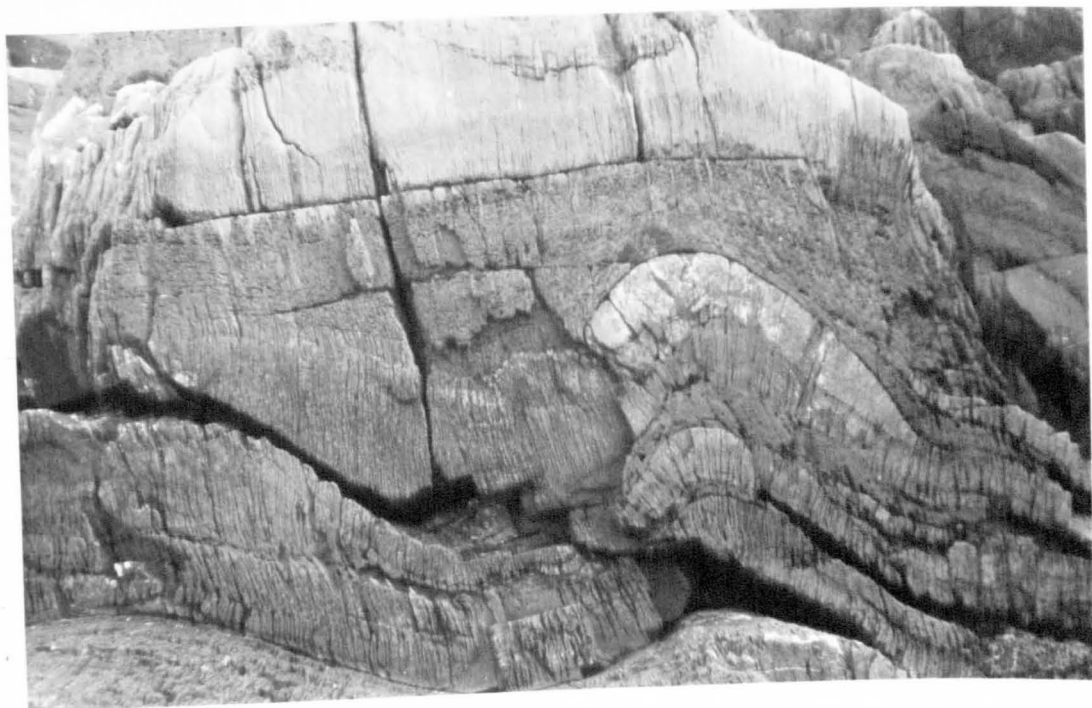


PLATE 107

Folding. A moderately sized monoclinal fold axis, in siltstone dominant lithology. Bedding returns to horizontal off-photograph to the left. The width of the area shown in the photograph is approximately 30m. Some slippage along bedding planes has occurred; picked out by a thin band of quartz veining in the upper part of the outcrop.

LOCATION - STRATIGRAPHIC: Iveragh Group

- GEOGRAPHIC: Valentia Island

PLATE 108

Folding. Small monoclinal fold in very fine siltstone lithology. Small rucksack (50cm high) in foreground for scale.

LOCATION - STRATIGRAPHIC: Iveragh Group

- GEOGRAPHIC: Valentia Island

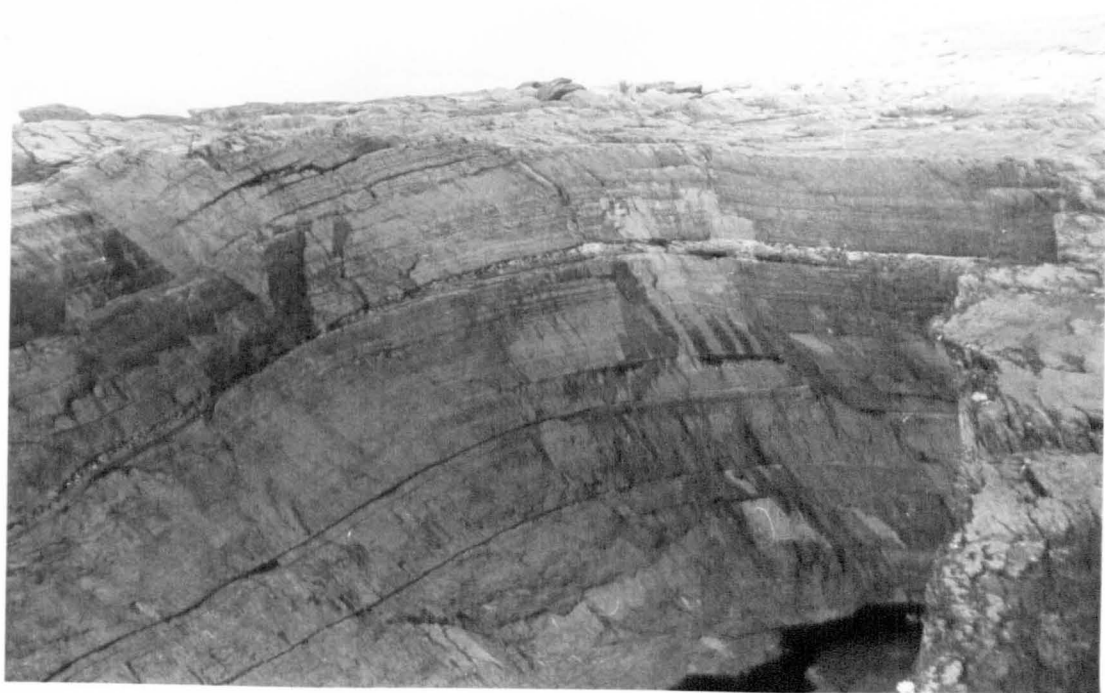


PLATE 109

Faulting. Minor thrust faulting along the axis of a small tight recumbent fold. The upper limb and fold nose are displaced 10m by overthrusting to the NW. Small rucksack (50cm high) near fold nose for scale.

LOCATION - STRATIGRAPHIC: Iveragh Formation

- GEOGRAPHIC: Valentia Island

PLATE 110

Faulting. A thrust fault plane dipping gently SE is picked out by the line of the track descending into the cove from left to right. The displacement is not known but attempted matching of sandstone beds across the fault requires a minimum movement of at least 10m.

LOCATION - STRATIGRAPHIC: St. Finan's Sandstone Formation

- GEOGRAPHIC: St. Finan's Bay



PLATE 111

Faulting. An irregularly curved wrench fault plane, with uniformly dipping strata on the left thrown against gently folded strata on the right. Several curving fractures splay from the fault into the rocks on the right, but show little or no displacement.

LOCATION - STRATIGRAPHIC: Iveragh Group

- GEOGRAPHIC: Valentia Island

PLATE 112

Faulting. Close-up view of quartz-cemented fault breccia, along the plane of a wrench fault with unknown displacement.

LOCATION - STRATIGRAPHIC: Valentia Slate Formation

- GEOGRAPHIC: Keel Strand



PLATE 113

'Fracture' cleavage. Rippled and laminated very fine sandstone with well developed 'fracture' cleavage. This type of cleavage is particularly well developed in rocks of this grain size. The photograph shows the anastomosing pattern of the cleavage in both section and plan views.

LOCATION - STRATIGRAPHIC: Ballinskelligs Sandstone Formation

- GEOGRAPHIC: Bolus Head

PLATE 114

'Fracture' cleavage. Close-up view of the cleavage, looking down on a bedding-plane surface. The cleavage is spaced at 2-3cm intervals. Two weakly developed intersecting joint patterns are also visible, indicating the same maximum compressive stress orientation as that which formed the cleavage. The cleavage is lined with a zone of white micas, which being softer than the rest of the rock, are selectively weathered out.

LOCATION - STRATIGRAPHIC: Ballinskelligs Sandstone Formation

- GEOGRAPHIC: Bolus Head



PLATE 115

Crenulated cleavage. Coarse siltstone with bedding approximately parallel to the upper surface of the outcrop. The closely spaced cleavage dipping to the right is crenulated, a localised effect which elsewhere in the study area has only been observed in the vicinity of faults showing minor displacement.

LOCATION - STRATIGRAPHIC: Iveragh Group

- GEOGRAPHIC: Beginish Island

PLATE 116

Kink bands. The rocks young and bedding dips gently to the right (SS), while slaty cleavage (S_1) dips steeply to the right. The kink bands are zones in which cleavage is rotated in a localised 'envelope' defined by a sharp angular change in cleavage orientation. The 'envelope' wedges out rapidly at both ends. Kink bands in this area all show a sinistral displacement. The photograph shows the southern limb of the Kilcrohane Anticline, looking NE parallel to the fold axis.

LOCATION - STRATIGRAPHIC: Valentia Slate Formation

- GEOGRAPHIC: Puffin Sound



PLATE 117

Pressure solution cleavage. Bedding in the photograph dips gently to the right. Calcite-filled tension fractures parallel to bedding are sharply truncated by the near vertical cleavage, demonstrating that pressure solution has occurred along the cleavage planes.

Estimation of the shortening using the apparent displacement of calcite veins along cleavage planes has not been attempted, due to the difficulty of correlating veins across the cleavage.

LOCATION - STRATIGRAPHIC: Purple Sandstone Formation

- GEOGRAPHIC: Sneem River

PLATE 118

Tension gashes. Two sets of en-echelon tension gashes (quartz filled), intersecting at approximately 60° . The gashes are exposed on a bedding-plane surface, and the trace of a fracture cleavage in the very fine sandstone is seen running from left to right across the photograph. From the intersection angle between the sets of tension gashes, the principle compressive stress forming the gashes was between the top and base of the photograph, and had the same orientation as that causing the fracture cleavage to form.

LOCATION - STRATIGRAPHIC: Cooncrome Sandstone Formation

- GEOGRAPHIC: Dolous Head

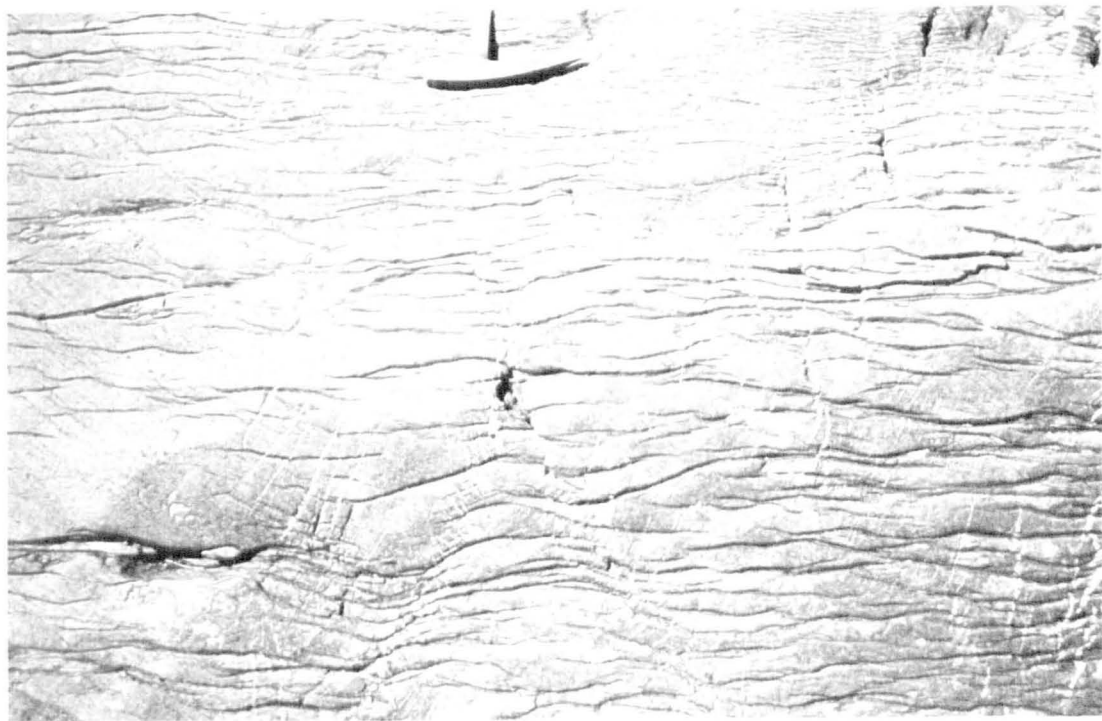


PLATE 119

Jointing and cleavage. This photograph of a cliff exposure shows the relative attitudes of bedding, cleavage and jointing on the northwestern end of the Iveragh Peninsula. Bedding in the rocks is subhorizontal, dipping gently to the right. The rocks are dominated by siltstone with a near-vertical slaty cleavage. Two joint patterns are visible; one parallel to the plane of the photograph controls the line of the cliff face, the other cuts the cliff face at 90° and is seen dipping fairly steeply to the left. The section of cliff shown in the photograph is approximately 7m in height.

LOCATION - STRATIGRAPHIC: Valentia Slate Formation

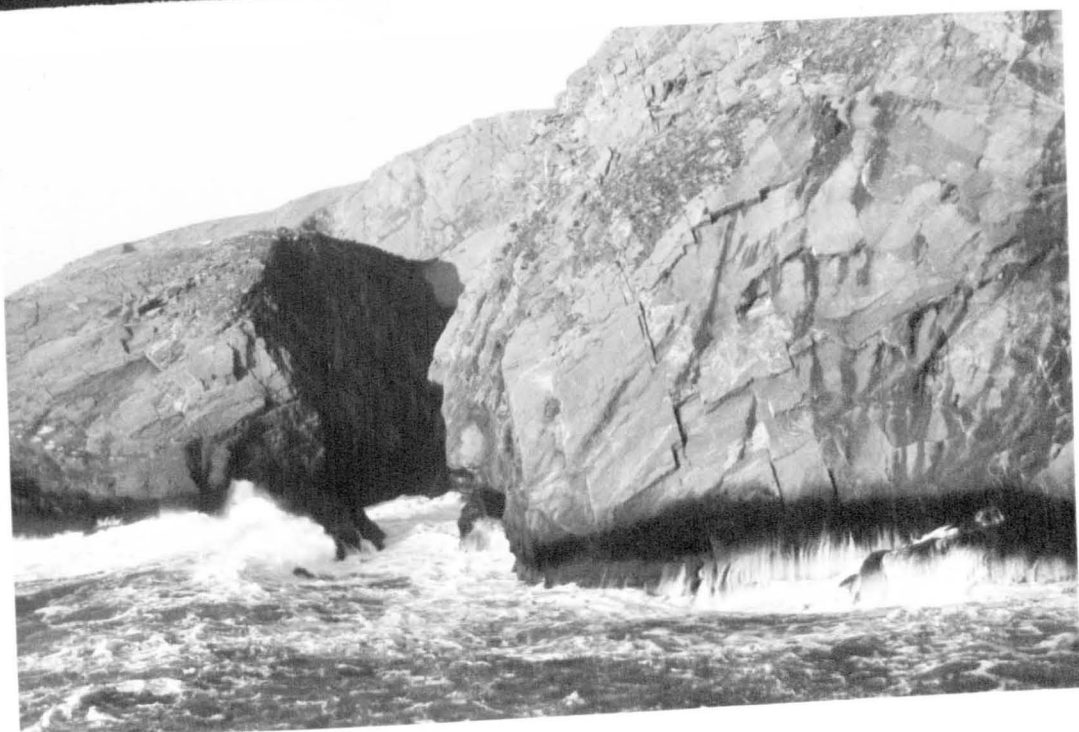
- GEOGRAPHIC: Puffin Sound

PLATE 120

Jointing. Bedding in this fine-sandstone dominant part of the succession dips steeply and the rocks young towards the camera. The two major joint patterns are clearly visible; one dipping at a high angle away from the camera, and the other at 90° to the cliff face dipping almost vertically to the right.

LOCATION - STRATIGRAPHIC: Ballinskelligs Sandstone Formation

- GEOGRAPHIC: Bolus Head



CONTINUES FROM

- | | | |
|------------------------|-----------------|------------------------|
| — = MASSIVE BEDDING | ↖ = X-BEDDED | ∇ = MUD CRACKS |
| ≡ = FLAT " | ↗ = X-LAMINATED | ∞ = CONVOLUTED BEDDING |
| ≡ = LAMINATED " | TR. = TROUGH | ∩ = CHANNEL |
| --- = PARTING LINATION | TAB. = TABULAR | /// = ORIFICATION |

EROSIVE W	GRADATIONAL ----	ABRUPT (NOT KNOWN IF EROSIONAL) ??
SHARP, NON-EROSIVE —	DEFORMED (LOAD CASTS ETC) U	UNDULATING ~
G = GOOD M = MODERATE P = POOR		NOT SEEN *
B = BLACK	GR. = GREEN	LC. = LIGHT
G = GREY	P = PURPLE	DL. = DARK D = DULL

[illegible]

ENCLOSURE 1

ENCLOSURE 2


```

2  C SOURCE FILE FILTER.FAS.GINO
4
6  C PROGRAM DEVELOPED AND WRITTEN BY K.J.RUSSELL
8  C PROGRAM TO FILTER LOG-DATA AND DRAW GRAPHIC LOG-SECTIONS.
10 C THE INPUT DATA IS LUMPED IN GROUPS OF SIZE *N*, AND FOR
12 C EACH GROUP THE TOTAL THICKNESS AND AVERAGE FACIES-TYPE
14 C ARE COMPUTED.
16 C PROGRAM THEN PLOTS A GRAPHIC-LOG-PROFILE USING THE
18 C TOTAL THICKNESS AND AVERAGED FACIES FOR
20 C EACH FILTERED UNIT. IF *N*-1 THE PROGRAM BYPASSES THE
22 C FILTERING SEGMENT AND PROCEEDS STRAIGHT TO PLOTTING THE
24 C GRAPHIC PROFILE
26 C THE FIRST ENTRY IN THE DATA FILE MUST BE THE VALUE OF *N*.
28 C THE FORMAT OF *N* IS (I3).
30 C THE SECOND ENTRY IN THE DATA FILE MUST BE THE VALUE OF SKALE1
32 C THE FORMAT OF SKALE1 IS (F7.3)
34 C THE THIRD ENTRY IN THE DATA FILE MUST BE THE VALUE OF SKALE2
36 C WHICH IS THE SCALE OF THE BAR WIDTH.
38 C THE FORMAT OF SKALE2 IS (F7.3)
40 C THE FOURTH ENTRY IN THE DATA FILE MUST BE A TITLE CARD UP TO
42 C 80 CHARACTERS OF ALPHAMERIC FORMAT.
44 C THE LAST TWO ENTRIES MUST BE 000000, TO TERMINATE THE PROGRAM.
46     INTEGER FAS,P,FSAV
48     DIMENSION TITLE(20)
50     DIMENSION FSTOT (11)
52     DIMENSION ILOC(5)
54     DIMENSION IBOT(5)
56     DIMENSION ITOP(5)
58     THICK=0.0
60     TTOT=0.0
62     K=0
64     TALLY=0.0
66     J=0
68     ICR=5
70     ILC=7
72     ILD=8
74 C THIS SEGMENT READS THE GROUPING-LEVEL (N)
76     READ (ICR,10) N
78 C THIS SEGMENT READS THE SCALE FACTORS
80     READ (ICR,12) SKALE1
82     READ (ICR,12) SKALE2
84     12 FORMAT(F7.3)
86     10 FORMAT (I3)
88     SKALE2=SKALE2*0.5
90 C NOMINATE DEVICE
92     CALL T4010
94 C SET WINDOW TO SCREEN LIMITS
96     CALL WINDOW(2)
98 C CLEAR SCREEN
100     CALL PICCLE
102 C MOVE ORIGIN TO START POINT

```

```

2 SOURCE FILE FILTER.FAS.GIV
4
6 FSAV=1
7 FSMAX=FSTOT(P)
8 3000 FSTOTS=FSTOT(P+1)
9 IF(FSMAX-FSTOTS) 3,4,4
10 3 FSMAX=FSTOTS
11 FSAV=(P+1)
12 GO TO 4000
13 4 FSMAX=FSMAX
14 FSAV=FSAV
15 4000 CONTINUE
16 IF(P.EQ.10) GO TO 5000
17 P=P+1
18 GO TO 3000
19 5000 CONTINUE
20 WRITE(ILC,84)FSAV
21 84 FORMAT(*FSAV=*,I3)
22 C FS COMPARISONS COMPLETE,READY TO PLOT
23 WRITE(ILO,35)IBOT,ITOP
24 35 FORMAT(1X,'GROUP ',5A1,'--',5A1)
25 C THIS SEGMENT SETS T,FAS TO THE VALUES OF THE GROUPED UNIT
26 T=THICK
27 FAS=FSAV
28 WRITE(ILC,89)FAS
29 89 FORMAT(I2,*****)
30 C THICK,FSAV RESET AS T,FAS
31 500 CONTINUE
32 FAS=12-FAS
33 C THIS SEG SETS THE INDEX NUMBER OF THE GROUP TO BE PLOTTED
34 J=J+1
35 WRITE(ILC,88)FAS
36 88 FORMAT(I2,*****)
37 C THIS SEGMENT PLOTS THE GRAPHIC PROFILE
38 ITOTS=ITOTS+T
39 T=T*SCALE1
40 C THIS SEG DRAWS DASHED LINE FOR FACIES 8-11,AND SETS WIDTH
41 C EQUAL TO 1-4
42 IF(FAS-4)85,85,86
43 85 CALL BROKEN(1)
44 IF(FAS.EQ.1)GO TO 70
45 IF(FAS.EQ.2)GO TO 71
46 IF(FAS.EQ.3)GO TO 72
47 IF(FAS.EQ.4)GO TO 73
48 70 FAS=8
49 GO TO 74
50 71 FAS=9
51 GO TO 74
52 72 FAS=10
53 GO TO 74
54 73 FAS=11
55 74 CONTINUE
56
58
60
62
64

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2
4
6      GO TO 92
8      86 CALL BROKEN(0)
10     92 CONTINUE
12     Y=(FLOAT(FAS))*SKALE2
14     CALL LINTO2(T,0.0)
16     CALL MOVT02(0.0,0.0)
18     CALL LINTO2(0.0,(-Y))
20     IF(J.EQ.1)GO TO 36
22     GO TO 37
24     36 CALL MOVT02(0.0,-60.0)
26     CALL CHASIZ(2.0,2.0)
28     CALL CHAANG(270.0)
30     CALL CHAARR(ILOC,5,1)
32     CALL MOVT02(0.0,(-Y))
34     37 CONTINUE
36     CALL LINTO2(T,(-Y))
38     CALL MOVT02(T,0.0)
40     CALL LINTO2(T,(-Y))
42     CALL MOVT02(T,0.0)
44     CALL SHIFT2(T,0.0)
46     CALL CHAMOD
48     C PLOT COMPLETED FOR ONE UNIT
50     TTOT=TTOT+T
52     C THIS SEG. ZEROES GROUP INDEX WHEN J VALUE IS REACHED
54     IF(J.EQ.10)GO TO 39
56     GO TO 40
58     39 J=0
60     40 CONTINUE
62     C THIS SEG. WIPES ARRAYS AND ZEROES VARIABLES BEFORE NEXT GROUP
64     DO 21 FAS=1,11
66     FSIOT(FAS)=0.0
68     21 CONTINUE
70     T=0.0
72     FAS=0
74     THICK=0.0
76     FSAV=0
78     C VARIABLES T,FAS,THICK,FSAV ALL ZEROED
80     C COMPUTING AND PLOTTING COMPLETE FOR ONE UNIT
82     GO TO 100
84     C THIS SEG. WRITES TITLE AND PARAMETERS ON GRAPH
86     8000 T=T+5.0
88     CALL CHASIZ(5.0,5.0)
90     CALL MOVT02(T,0.0)
92     CALL CHAANG(270.0)
94     CALL CHAHOL(13HGROUPING N=*. )
96     CALL CHAINT(N,5)
98     T=T+10.0
100    CALL MOVT02(T,0.0)
102    CALL CHAHOL(21HSCALE2 (BAR WIDTH)=*. )
104    CALL CHAFX(SKALE2,10,3)
106
108
110
112
114
116
118
120
122
124
126
128
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132
134
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164

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4
6      T=T+10.0
      CALL MOVTO2(T,0.0)
      CALL CHAHOL(21HSCALE1 (THICKNESS)=*.)
8      CALL CHAFIX(SKALE1,10,3)
      T=T+10.0
10     CALL MOVTO2(T,0.0)
      CALL CHAHOL(13HFACIES,PLOT*.)
12     T=T+10.0
      CALL MOVTO2(T,0.0)
14     CALL CHASIZ(10.0,10.0)
      CALL CHAARR(TITLE,20,4)
16     C THIS SEGMENT DRAWS SCALE BAR
      NINTS=IFIX((TTOTS+10.0)/10.0)
18     AXLEN=(FLOAT(NINTS)*10.0)*SKALE1
      CALL AXISCA(3,NINTS,0.0,AXLEN,1)
20     CALL AXIPGS(1,-TTOT,10.0,AXLEN,1)
      CALL BROKEN(0)
22     CALL AXIDRA(+2,0,1)
      WRITE(ILD,87)TALLY
24     87 FORMAT(F10.3,'-FULL THICKNESS OF SECTION',
1* INCLUDING EXPOSURE GAPS')
26     WRITE(ILD,94)TTOTS1
      94 FORMAT(F10.3,'-FULL THICKNESS OF SECTION',
28     1* MINUS EXPOSURE GAPS')
      WRITE(ILD,99)TTOTS
30     99 FORMAT(F10.3,'-THICKNESS OF SECTION ON GRAPHED PROFILE',
1* I.E. MINUS DISCARDED UNITS NOT COMPLETING LAST',
32     2* FILTERED UNIT')
      C PLOT COMPLETE FOR ALL GROUPS, TITLE AND PARAMETERS WRITTEN
34     WRITE(ILD,51)TTOT
      51 FORMAT(1X,'GRAPH PROFILE IS ',F15.3,'MM. LONG')
36     WRITE(ILD,52)SKALE1
      52 FORMAT(1X,'SCALE1 FACTOR IS ',F7.3)
38     WRITE(ILD,54)SKALE2
      54 FORMAT(1X,'SCALE2 FACTOR IS ',F7.3)
40     WRITE(ILD,53)N
      53 FORMAT(1X,'GROUPING LEVEL IS ',I3)
42     C RELEASE DEVICE
      CALL DEVEND
44     CALL EXIT
      END
46
48
50
52
54
56
58
60
62
64

```


ENCLOSURE 3


```

4
6 C SOURCEFILE FILTER.GS.GINQ
8 C PROGRAM DEVELOPED AND WRITTEN BY K.J.RUSSELL
10 C PROGRAM TO FILTER LOG-DATA AND DRAW GRAPHIC LOG-SECTIONS.
12 C THE INPUT DATA IS LUMPED IN GROUPS OF SIZE *N*, AND FOR
14 C EACH GROUP THE TOTAL THICKNESS AND AVERAGE GRAINSIZE
16 C ARE COMPUTED.
18 C PROGRAM THEN PLOTS A GRAPHIC-LOG-PROFILE USING THE
20 C TOTAL THICKNESS AND AVERAGED GRAINSIZE FOR
22 C EACH FILTERED UNIT. IF *N*=1 THE PROGRAM BYPASSES THE
24 C FILTERING SEGMENT AND PROCEEDS STRAIGHT TO PLOTTING THE
26 C GRAPHIC PROFILE
28 C THE FIRST ENTRY IN THE DATA FILE MUST BE THE VALUE OF *N*.
30 C THE FORMAT OF *N* IS (I3)
32 C THE SECOND ENTRY IN THE DATA FILE MUST BE THE VALUE OF SKALE1
34 C THE FORMAT OF SKALE1 IS (F7.3)
36 C THE THIRD ENTRY IN THE DATA FILE MUST BE THE VALUE OF SKALE2
38 C WHICH IS THE SCALE OF THE BAR WIDTH.
40 C THE FORMAT OF SKALE2 IS (F7.3)
42 C THE FOURTH ENTRY IN THE DATA FILE MUST BE A TITLE CARD UP TO
44 C 80 CHARACTERS OF ALPHAMERIC FORMAT.
46 C THE LAST TWO ENTRIES MUST BE 000000, TO TERMINATE THE PROGRAM.
48 INTEGER GS,P,GSAY
50 DIMENSION GSTOT(8)
52 DIMENSION TITLE(20)
54 DIMENSION ILOC(5)
56 DIMENSION IBOT(5)
58 DIMENSION ITOP(5)
60 THICK=0.0
62 ITOT=0.0
64 K=0
66 TALLY=0.0
68 J=0
70 ICR=5
72 ILC=7
74 ILQ=8
76 C THIS SEGMENT READS THE GROUPING-LEVEL (N)
78 READ (ICR,10) N
80 C THIS SEGMENT READS THE SCALE FACTORS
82 READ (ICR,12) SKALE1
84 READ (ICR,12) SKALE2
86 12 FORMAT(F7.3)
88 10 FORMAT(I3)
90 C NOMINATE DEVICE
92 CALL T4010
94 C SET WINDOW TO SCREEN LIMITS
96 CALL WINDOW(2)
98 C CLEAR SCREEN
100 CALL PICCLE
102 C MOVE ORIGIN TO START POINT
104 CALL SHIFT(218.0,175.0)

```



```

4
6      CALL MOVTO2(0.0,0.0)
      CALL CHAMOD
8      C THIS SEGMENT READS TITLE
      READ(ICR,31)TITLE
      WRITE(ILD,31)TITLE
10     WRITE(ILD,65)
      65 FORMAT(*GRAINSIZE PLOT*)
12     31 FORMAT(20A4)
      C READ THE FIRST VALUES OF T,GS,ILOC
14     100 READ (ICR,11) T,GS,ILOC
      TALLY=TALLY+T
16     IF(T.EQ.0.0) GO TO 8000
      11 FORMAT (F5.2,1X,I1,3X,5A1)
18     C IF ENTRY IS EXPOSURE GAP, IGNORE AND READ NEXT ENTRY
      IF(GS.EQ.0) GO TO 100
20     TTOTS1=TTOTS1+T
      C THIS SEGMENT BYPASSES FILTER IF N=1
22     IF(N.EQ.1) GO TO 500
      C THIS SEGMENT INCREMENTS THICKNESS TO GIVE UNIT TOTAL
24     THICK=THICK+T
      C THIS SEGMENT INCREMENTS THICKNESS FOR EACH GS TYPE
26     GSTOT(GS)=GSTOT(GS)+T
      C THIS SEGMENT STOPS INCREMENTING WHEN (N)ENTRIES HAVE BEEN READ IN
28     K=K+1
      IF(K.EQ.1) GO TO 26
      IF(K.EQ.N) GO TO 27
30     GO TO 28
32     C THIS SEG SETS IBOT AND ITOP TO FIRST AND LAST ILOC VALUES FOR THIS GROUP
      26 DO 98 LL=1,5
34     IBOT(LL)=ILOC(LL)
      98 CONTINUE
36     GO TO 28
      27 DO 28 LLL=1,5
38     ITOP(LLL)=ILOC(LLL)
      28 CONTINUE
40     IF(K.EQ.N) GO TO 600
      GO TO 100
42     600 CONTINUE
      K=0
44     WRITE(ILC,82)GSTOT
      82 FORMAT(*ESTOT=*,11F10.3)
46     C K RESET TO ZERO, ONE GROUP INCREMENTED
      C THIS SEGMENT DETERMINES *AVERAGE* GS
48     GSMAX=0.0
      GSTOTS=0.0
50     GSAV=0
      P=1
52     GSAV=1
      GSMAX=GSTOT(P)
54     700 GSTOTS=GSTOT(P+1)

```

```

2  IF(GSMAX-GSTOTS) 1,2,2
4
6  1 GSMAX=GSTOTS
8  GSAV=(P+1)
   GO TO 800
10  2 GSMAX=GSMAX
   GSAV=GSAV
12  800 CONTINUE
   IF(P.EQ.7) GO TO 900
   P=P+1
   GO TO 700
14  900 CONTINUE
16  5000 CONTINUE
   WRITE(ILC,84)GSAV
18  84 FORMAT(*GSAV=*,I3)
   C GS COMPARISONS COMPLETE,READY TO PLOT
20  WRITE(ILO,35)IBOT,ITOP
   35 FORMAT(1X,*GROUP *,5A1,*-*,5A1)
22  C THIS SEGMENT SETS T,GS TO THE VALUES OF THE GROUPED UNIT
   T=THICK
   GS=GSAV
   WRITE(ILC,89)GS
24  89 FORMAT(I2,*,*)
   C THICK,GSAV RESET AS T,GS
26  500 CONTINUE
   C THIS SEGMENT SETS THE INDEX NUMBER OF THE GROUP TO BE PLOTTED
30  J=J+1
   WRITE(ILC,88)GS
32  88 FORMAT(I2,*,*)
   C THIS SEGMENT PLOTS THE GRAPHIC PROFILE
34  TTOTS=TTOTS+T
   T=T*SCALE1
36  Y=(FLOAT(GS))*SCALE2
   CALL LINT02(T,0.0)
38  CALL MOVTO2(0.0,0.0)
   CALL LINT02(0.0,(-Y))
40  IF(J.EQ.1)GO TO 36
   GO TO 37
42  36 CALL MOVTO2(0.0,-50.0)
   CALL CHASIZ(2.0,2.0)
44  CALL CHAANG(270.0)
   CALL CHAARR(ILOC,5,1)
46  CALL MOVTO2(0.0,(-Y))
   37 CONTINUE
48  CALL LINT02(T,(-Y))
   CALL LINT02(T,0.0)
50  CALL SHIFT2(T,0.0)
   CALL CHAMOD
52  C PLOT COMPLETED FOR ONE UNIT
   ITOT=ITOT+T
54  C THIS SEG. ZEROES GROUP INDEX WHEN J VALUE IS REACHED
56
58
60
62
64

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2  C SOURCE FILE FILTER.DS.DINO
4
6  IF(J.EQ.10)GO TO 39
6  GO TO 40
8  39 J=0
8  40 CONTINUE
10 C THIS SEG. WIPES ARRAYS AND ZEROES VARIABLES BEFORE NEXT GROUP
10 DO 20 GS=1,8
12 GSTOT(GS)=0.0
12 20 CONTINUE
14 I=0.0
14 GS=0
16 THICK=0.0
16 GSAV=0
18 C VARIABLES I,GS,THICK,GSAV ALL ZEROED
18 C COMPUTING AND PLOTTING COMPLETE FOR ONE UNIT
20 GO TO 100
20 C THIS SEG. WRITES TITLE AND PARAMETERS ON GRAPH
22 8000 I=I+5.0
22 CALL CHASIZ(5.0,5.0)
24 CALL MOVT02(T,0.0)
24 CALL CHAANG(270.0)
26 CALL CHAHOL(13HGROUPING N=*. )
26 CALL CHAINT(N,5)
28 T=T+10.0
28 CALL MOVT02(T,0.0)
30 CALL CHAHOL(21HSCALE2 (BAR WIDTH)=*. )
30 CALL CHAFIX(SKALE2,10,3)
32 T=T+10.0
32 CALL MOVT02(T,0.0)
34 CALL CHAHOL(21HSCALE1 (THICKNESS)=*. )
34 CALL CHAFIX(SKALE1,10,3)
36 T=T+10.0
36 CALL MOVT02(T,0.0)
38 CALL CHAHOL(16HGRAINSIZE.PLOT*. )
38 T=T+10.0
40 CALL MOVT02(T,0.0)
40 CALL CHASIZ(10.0,10.0)
42 CALL CHAARR(TITLE,20,4)
42 C THIS SEGMENT DRAWS SCALE BAR
44 NINTS=IFIX((TTOTS+10.0)/10.0)
44 AXLEN=(FLOAT(NINTS)*10.0)*SKALE1
46 CALL AXISCA(3,NINTS,0.0,AXLEN,1)
46 CALL AXIP0S(1,-TTOT,10.0,AXLEN,1)
48 CALL BROKEN(0)
48 CALL AXIDRA(*2,0,1)
50 WRITE(ILD,87)TALLY
50 87 FORMAT(F10.3,'=FULL THICKNESS OF SECTION',
52 1' INCLUDING EXPOSURE GAPS')
52 WRITE(ILD,94)TTOTS1
54 94 FORMAT(F10.3,'=FULL THICKNESS OF SECTION',
54 1' MINUS EXPOSURE GAPS')
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60
62
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WRITE(ILD,99)TTOTS

99 FORMAT(F10.3,'=THICKNESS OF SECTION ON GRAPHED PROFILE',

1',I.E. MINUS DISCARDED UNITS NOT COMPLETING LAST',

2' FILTERED UNIT')

C PLOT COMPLETE FOR ALL GROUPS, TITLE AND PARAMETERS WRITTEN

WRITE(ILD,51)TTOT

51 FORMAT(1X,'GRAPH PROFILE IS ',F15.3,'MM. LONG')

WRITE(ILD,52)SKALE1

52 FORMAT(1X,'SCALE1 FACTOR IS ',F7.3)

WRITE(ILD,54)SKALE2

54 FORMAT(1X,'SCALE2 FACTOR IS ',F7.3)

WRITE(ILD,53)N

53 FORMAT(1X,'GROUPING LEVEL IS ',I3)

C RELEASE DEVICE

CALL DEVEND

CALL EXIT

END

ENCLOSURE 4

C SOURCE FILE SUMLOG.GINO

C SOURCE FILE SUMLOG.GINO

C PROGRAM TO DRAW SUMMARY LOG OF STRATIGRAPHIC SECTIONS.

C DEVELOPED AND WRITTEN BY K.J.RUSSELL

C NO RESULTS OUTPUT FILE IS NEEDED, THERE IS NO LINEPRINT OUTPUT

C THE FIRST ENTRY IN THE FILE MUST BE DUMMY1 (I3)

C THE SECOND ENTRY MUST BE SCALE (THICKNESS) (F7.3)

C THE THIRD ENTRY MUST BE DUMMY2 (F7.3)

C THE FOURTH ENTRY MUST BE TITLE (20A4)

C THE DATA ENTRIES MUST BE FORMAT (F5.2,1X,I1,37X,I2)

C FOR THICKNESS, GRAINSIZE AND FACIES TYPE RESPECTIVELY

C THE LAST TWO ENTRIES IN THE FILE SHOULD BOTH BE 000000 TO TERMINATE

C THE PROGRAM.

INTEGER GS,FAS,DUMMY1

DIMENSION TITLE(20)

FACA=0.0

FACB=0.0

FACC=0.0

FACD=0.0

FACE=0.0

FACF=0.0

FACG=0.0

FACH=0.0

FACI=0.0

FACJ=0.0

FACK=0.0

FAXA=0.0

FAXB=0.0

FAXC=0.0

FAXD=0.0

FAXE=0.0

FAXF=0.0

FAXG=0.0

FAXH=0.0

FAXI=0.0

FAXJ=0.0

FAXK=0.0

FACTOT=0.0

ICR=5

C OPEN UP THE GRAPH PLOTTER

CALL CC906

CALL WINDOW(2)

CALL PICCLE

C BRING THE PEN TO THE ORIGIN

CALL MOVTO2 (1.0,205.0)

CALL SHIFT2 (1.0,205.0)

C READ DUMMY1,SCALE,DUMMY2,TITLE

READ(ICR,93)DUMMY1

READ(ICR,92)SCALE

READ(ICR,91)DUMMY2

READ(ICR,90)TITLE

C SOURCE FILE SUMLOG.GINO

93 FORMAT(I3)

92 FORMAT(F7.3)

91 FORMAT(F7.3)

90 FORMAT(20A4)

SKALE=SKALE*5

C READ THE FIRST DATA CARD

60 READ (ICR,41) T,GS,FAS

41 FORMAT (F5.2,1X,I1,37X,I2)

IF(T.EQ.0.0) GO TO 200

IF(FAS.EQ.0) GO TO 60

IF(FAS.EQ.1)FAXA=FAXA+T

IF(FAS.EQ.2)FAXB=FAXB+T

IF(FAS.EQ.3)FAXC=FAXC+T

IF(FAS.EQ.4)FAXD=FAXD+T

IF(FAS.EQ.5)FAXE=FAXE+T

IF(FAS.EQ.7)FAXG=FAXG+T

IF(FAS.EQ.8)FAXH=FAXH+T

IF(FAS.EQ.9)FAXI=FAXI+T

IF(FAS.EQ.10)FAXJ=FAXJ+T

IF(FAS.EQ.11)FAXK=FAXK+T

GO TO 60

200 CONTINUE

FACTOT=FAXA+FAXB+FAXC+FAXD+FAXE+FAXG+FAXH+FAXI+FAXJ+FAXK

IF(FAXA.EQ.0.0) GO TO 70

FACA=100*(FAXA/FACTOT)

75 IF(FAXB.EQ.0.0) GO TO 71

FACB=100*(FAXB/FACTOT)

76 IF(FAXC.EQ.0.0) GO TO 72

FACC=100*(FAXC/FACTOT)

77 IF(FAXD.EQ.0.0) GO TO 73

FACD=100*(FAXD/FACTOT)

78 IF(FAXE.EQ.0.0) GO TO 74

FACE=100*(FAXE/FACTOT)

63 IF(FAXG.EQ.0.0) GO TO 64

FACG=100*(FAXG/FACTOT)

65 IF(FAXH.EQ.0.0) GO TO 66

FACH=100*(FAXH/FACTOT)

67 IF(FAXI.EQ.0.0) GO TO 68

FACI=100*(FAXI/FACTOT)

69 IF(FAXJ.EQ.0.0) GO TO 79

FACJ=100*(FAXJ/FACTOT)

81 IF(FAXK.EQ.0.0) GO TO 82

FACK=100*(FAXK/FACTOT)

GO TO 80

70 FACA=0.0

GO TO 75

71 FACB=0.0

GO TO 76

72 FACC=0.0

GO TO 77

C SOURCE FILE SUMLOG.GINO

73 FACD=0.0

GO TO 78

74 FACE=0.0

GO TO 63

64 FACG=0.0

GO TO 65

66 FACH=0.0

GO TO 67

68 FACI=0.0

GO TO 69

79 FACJ=0.0

GO TO 81

82 FACK=0.0

C THIS SEGMENT DRAWS THE GRAPH

80 CALL CHASIZ(2.0,2.0)

CALL CHAANG(270.0)

IF(FACA.EQ.0.0) GO TO 83

C DRAW CONGLOMERATE FACIES

UT=FACA*SKALE

UTX=UT/2.0

CALL LINTO2 (UT,0.0)

CALL MOVTO2(UTX,-60.0)

CALL CHAHOL(21HCONGLOMERATE FACIES*.)

CALL CHAFIX(FACA,8,2)

CALL MOVTO2 (0.0,0.0)

CALL LINTO2 (0.0,-40.0)

CALL LINTO2 (UT,-40.0)

CALL LINTO2 (UT,0.0)

CALL SHIFT2 (UT,0.0)

83 IF(FACB.EQ.0.0) GO TO 84

C DRAW SANDSTONE BODY FACIES

UT=FACB*SKALE

UTX=UT/2.0

CALL LINTO2(UT,0.0)

CALL MOVTO2(UTX,-60.0)

CALL CHAHOL(23HSANDSTONE BODY FACIES*.)

CALL CHAFIX(FACB,8,2)

CALL MOVTO2(0.0,0.0)

CALL LINTO2(0.0,-35.0)

CALL LINTO2(UT,-35.0)

CALL LINTO2(UT,0.0)

CALL SHIFT2(UT,0.0)

84 IF(FACC.EQ.0.0) GO TO 85

C DRAW RIPPLED AND LAMINATED FACIES

UT=FACC*SKALE

UTX=UT/2.0

CALL LINTO2(UT,0.0)

CALL MOVTO2(UTX,-60.0)

CALL CHAHOL(25HRIPPLED AND LAM. FACIES*.)

CALL CHAFIX(FACC,8,2)

C SOURCE FILE SUMLOG.GINO

CALL MOVTO2(0.0,0.0)

CALL LINTO2(0.0,-30.0)

CALL LINTO2(UT,-30.0)

CALL LINTO2(UT,0.0)

CALL SHIFT2(UT,0.0)

85 IF (FACD.EQ.0.0) GO TO 86

C DRAW SAND LAMINATED SILT FACIES

UT=FACD*SKALE

UTX=UT/2.0

CALL LINTO2(UT,0.0)

CALL MOVTO2(UTX,-60.0)

CALL CHAHOL(25HSAND. LAM. SILT. FACIES*.)

CALL CHAFIX(FACD,8,2)

CALL MOVTO2(0.0,0.0)

CALL LINTO2(0.0,-25.0)

CALL LINTO2(UT,-25.0)

CALL LINTO2(UT,0.0)

CALL SHIFT2(UT,0.0)

86 IF (FACE.EQ.0.0) GO TO 87

C DRAW BIOTURBATED FACIES

UT=FACE*SKALE

UTX=UT/2.0

CALL LINTO2(UT,0.0)

CALL MOVTO2(UTX,-60.0)

CALL CHAHOL(20HBIOTURBATED FACIES*.)

CALL CHAFIX(FACE,8,2)

CALL MOVTO2(0.0,0.0)

CALL LINTO2(0.0,-20.0)

CALL LINTO2(UT,-20.0)

CALL LINTO2(UT,0.0)

CALL SHIFT2(UT,0.0)

87 IF (FACG.EQ.0.0) GO TO 88

C DRAW MASSIVE SILTSTONE

UT=FACG*SKALE

UTX=UT/2.0

CALL LINTO2(UT,0.0)

CALL MOVTO2(UTX,-60.0)

CALL CHAHOL(26HMASSIVE SILTSTONE FACIES*.)

CALL CHAFIX(FACG,8,2)

CALL MOVTO2(0.0,0.0)

CALL LINTO2(0.0,-10.0)

CALL LINTO2(UT,-10.0)

CALL LINTO2(UT,0.0)

CALL SHIFT2(UT,0.0)

88 IF (FACH.EQ.0.0) GO TO 89

C DRAW QUARTZITIC SANDSTONE FACIES

CALL BROKEN(1)

UT=FACH*SKALE

UTX=UT/2.0

CALL LINTO2(UT,0.0)

C SOURCE FILE SUMLOG.GINO

```
CALL MOVT02(UTX,-60.0)
CALL CHAHOL(29HQARTZITIC SANDSTONE FACIES*.)
CALL CHAFIX(FACH,8,2)
CALL MOVT02(0.0,0.0)
CALL LINT02(0.0,-40.0)
CALL LINT02(UT,-40.0)
CALL LINT02(UT,0.0)
CALL SHIFT2(UT,0.0)
```

89 IF(FACI.EQ.0.0) GO TO 95

C DRAW SAND LENSED SILT FACIES

```
CALL BROKEN(1)
UT=FACI*SCALE
UTX=UT/2.0
CALL LINT02(UT,0.0)
CALL MOVT02(UTX,-60.0)
CALL CHAHOL(25HSAND-LENSED SILT FACIES*.)
CALL CHAFIX(FACI,8,2)
CALL MOVT02(0.0,0.0)
CALL LINT02(0.0,-35.0)
CALL LINT02(UT,-35.0)
CALL LINT02(UT,0.0)
CALL SHIFT2(UT,0.0)
```

95 IF(FACJ.EQ.0.0) GO TO 96

C DRAW FINE HETEROLITHIC FACIES

```
CALL BROKEN(1)
UT=FACJ*SCALE
UTX=UT/2.0
CALL LINT02(UT,0.0)
CALL MOVT02(UTX,-60.0)
CALL CHAHOL(26HFINE HETEROLITHIC FACIES*.)
CALL CHAFIX(FACJ,8,2)
CALL MOVT02(0.0,0.0)
CALL LINT02(0.0,-30.0)
CALL LINT02(UT,-30.0)
CALL LINT02(UT,0.0)
CALL SHIFT2(UT,0.0)
```

96 IF(FACK.EQ.0.0) GO TO 97

C DRAW LAM AND RIPPLED GREY SILTSTONE FACIES

```
CALL BROKEN(1)
UT=FACK*SCALE
UTX=UT/2.0
CALL LINT02(UT,0.0)
CALL MOVT02(UTX,-60.0)
CALL CHAHOL(29HLAM. AND RIPPLED GREY SILT*.)
CALL CHAFIX(FACK,8,2)
CALL MOVT02(0.0,0.0)
CALL LINT02(0.0,-25.0)
CALL LINT02(UT,-25.0)
CALL LINT02(UT,0.0)
CALL SHIFT2(UT,0.0)
```

C SOURCE FILE SUMLOG.GINO

97 UTX=UTX+10

CALL MOVTO2(UTX,0.0)

CALL CHASIZ(5.0,5.0)

CALL CHAMOD

CALL CHAARR(TITLE,20,4)

CALL DEVEND

CALL EXIT

END

ENCLOSURE 5

4
6 C C SOURCEFILE MARX.6

C PROGRAM TO DO MARKOV ANALYSIS, CALCULATE K-STATISTIC, AND CALCULATE
C CHI-SQUARE BY THE METHODS OF BILLINGSLEY (1961) AND
C GINGERICH (1969)

10 C THE FIRST ENTRY IS DUMMY1,FORMAT(I3)

C THE SECOND ENTRY IS DUMMY2,FORMAT(F7.3)

12 C THE THIRD ENTRY IS DUMMY3,FORMAT(F7.3)

C THE FOURTH ENTRY IS TITLE,FORMAT(20A4)

14 C THE LAST TWO ENTRIES MUST BE 000000,TO TERMINATE PROGRAM

DIMENSION TITLE(20)

16 INTEGER X,Y,TOTAL

INTEGER SUMI,SUMJ

18 DIMENSION I(6,6),R(6,6),V(6,6),W(6,6),U(6,6)

DIMENSION SUMI(6),SUMV(6),SUMJ(6)

20 DIMENSION SUMVI(6),SUMVJ(6)

ICR=5

22 ILP=6

C PROGRAM TO CALCULATE TRANSITION PROBABILITY MATRIX

24 DO 77 X=1,6

DO 77 Y=1,6

26 I(X,Y)=0

77 CONTINUE

28 READ(ICR,79)DUMMY1

READ(ICR,98)DUMMY2

30 READ(ICR,98)DUMMY3

79 FORMAT(I3)

32 98 FORMAT(F7.3)

READ(ICR,75)TITLE

34 75 FORMAT(20A4)

WRITE(ILP,97)TITLE

36 97 FORMAT(1X,20A4)

C THIS SEGMENT CALCULATES TRANSITION COUNT MATRIX AND LISTS FACIES

38 WRITE (ILP,70)

70 FORMAT (1H1,'LIST OF FACIES FREQUENCIES')

40 300 READ (ICR,40) IFAS

IF (IFAS.EQ.0) GO TO 501

42 IF(IFAS.EQ.6) GO TO 300

IF(IFAS.GE.8) GO TO 300

44 301 READ (ICR,40) IFASX

40 FORMAT (44X,I2)

46 IF (IFASX.EQ.0) GO TO 300

IF(IFAS.EQ.6) GO TO 300

48 IF(IFAS.GE.8) GO TO 300

IF (IFAS.EQ.1) GO TO 101

50 IF (IFAS.EQ.2) GO TO 102

IF (IFAS.EQ.3) GO TO 103

52 IF (IFAS.EQ.4) GO TO 104

IF (IFAS.EQ.5) GO TO 105

54 IF(IFAS.EQ.7) GO TO 106

101 IF (IFAS.EQ.1) GO TO 201

```
4  
6 IF(IFASX.EQ.1) I(1,1)=I(1,1)+1  
IF(IFASX.EQ.2) I(1,2)=I(1,2)+1  
8 IF(IFASX.EQ.3) I(1,3)=I(1,3)+1  
IF(IFASX.EQ.4) I(1,4)=I(1,4)+1  
10 IF(IFASX.EQ.5) I(1,5)=I(1,5)+1  
IF(IFASX.EQ.7) I(1,6)=I(1,6)+1  
12 GO TO 201
```

```
102 IF (IFAS.EQ.IFASX) GO TO 201
```

```
14 IF(IFASX.EQ.1) I(2,1)=I(2,1)+1  
IF(IFASX.EQ.2) I(2,2)=I(2,2)+1  
16 IF(IFASX.EQ.3) I(2,3)=I(2,3)+1  
IF(IFASX.EQ.4) I(2,4)=I(2,4)+1  
18 IF(IFASX.EQ.5) I(2,5)=I(2,5)+1  
IF(IFASX.EQ.7) I(2,6)=I(2,6)+1  
20 GO TO 201
```

```
103 IF (IFAS.EQ.IFASX) GO TO 201
```

```
22 IF(IFASX.EQ.1) I(3,1)=I(3,1)+1  
IF(IFASX.EQ.2) I(3,2)=I(3,2)+1  
24 IF(IFASX.EQ.3) I(3,3)=I(3,3)+1  
IF(IFASX.EQ.4) I(3,4)=I(3,4)+1  
26 IF(IFASX.EQ.5) I(3,5)=I(3,5)+1  
IF(IFASX.EQ.7) I(3,6)=I(3,6)+1  
28 GO TO 201
```

```
104 IF (IFAS.EQ.IFASX) GO TO 201
```

```
30 IF(IFASX.EQ.1) I(4,1)=I(4,1)+1  
IF(IFASX.EQ.2) I(4,2)=I(4,2)+1  
32 IF(IFASX.EQ.3) I(4,3)=I(4,3)+1  
IF(IFASX.EQ.4) I(4,4)=I(4,4)+1  
34 IF(IFASX.EQ.5) I(4,5)=I(4,5)+1  
IF(IFASX.EQ.7) I(4,6)=I(4,6)+1  
36 GO TO 201
```

```
105 IF (IFAS.EQ.IFASX) GO TO 201
```

```
38 IF(IFASX.EQ.1) I(5,1)=I(5,1)+1  
IF(IFASX.EQ.2) I(5,2)=I(5,2)+1  
40 IF(IFASX.EQ.3) I(5,3)=I(5,3)+1  
IF(IFASX.EQ.4) I(5,4)=I(5,4)+1  
42 IF(IFASX.EQ.5) I(5,5)=I(5,5)+1  
IF(IFASX.EQ.7) I(5,6)=I(5,6)+1  
44 GO TO 201
```

```
106 IF(IFAS.EQ.IFASX) GO TO 201
```

```
46 IF(IFASX.EQ.1) I(6,1)=I(6,1)+1  
IF(IFASX.EQ.2) I(6,2)=I(6,2)+1  
48 IF(IFASX.EQ.3) I(6,3)=I(6,3)+1  
IF(IFASX.EQ.4) I(6,4)=I(6,4)+1  
50 IF(IFASX.EQ.5) I(6,5)=I(6,5)+1  
IF(IFASX.EQ.7) I(6,6)=I(6,6)+1  
52
```

```
201 CONTINUE
```

```
54 IFAS=IFASX
```

```
GO TO 301
```

```
56 501 DO 72 X=1,6  
58  
60  
62  
64
```



```

6 72 SUMI(X)=I(X,1)+I(X,2)+I(X,3)+I(X,4)+I(X,5)+I(X,6)
   DO 71 Y=1,6
8 71 SUMJ(Y)=I(1,Y)+I(2,Y)+I(3,Y)+I(4,Y)+I(5,Y)+I(6,Y)
   TOTAL=SUMI(1)+SUMI(2)+SUMI(3)+SUMI(4)+SUMI(5)+SUMI(6)
10 C THIS SEGMENT PRINTS LIST OF FACIES FREQUENCIES
   WRITE (ILP,48) SUMI(1)
12   WRITE (ILP,49) SUMI(2)
   WRITE (ILP,50) SUMI(3)
14   WRITE (ILP,51) SUMI(4)
   WRITE (ILP,52) SUMI(5)
16   WRITE (ILP,63) SUMI(6)
48 FORMAT (///1X,*(1) CONGLOMERATE FACIES *,15)
18 49 FORMAT (1X,*(2) SANDSTONE BODY FACIES *,15)
50 FORMAT (1X,*(3) RIPPLED AND LAMINATED FACIES *,15)
20 51 FORMAT (1X,*(4) SAND LAMINATED SILT FACIES *,15)
52 FORMAT (1X,*(5) BIOTURBATED FACIES *,15)
22 63 FORMAT (1X,*(6) MASSIVE SILTSTONE FACIES *,15)
C THIS SEGMENT PRINTS TRANSITION COUNT MATRIX
24   WRITE (ILP,41)
41 FORMAT (1H1,*** TRANSITION COUNT MATRIX ***)
26   WRITE (ILP,42)
42 FORMAT (* TO (1) (2) (3) (4) (5) (6)*)
28 43 FORMAT (1H0,*FROM (1) *,6I7)
44 FORMAT (1X,* (2) *,6I7)
30 45 FORMAT (1X,* (3) *,6I7)
46 FORMAT (1X,* (4) *,6I7)
32 47 FORMAT (1X,* (5) *,6I7)
64 FORMAT (1X,* (6) *,6I7)
34   WRITE(ILP,43) (I(1,Y),Y=1,6)
   WRITE(ILP,44) (I(2,Y),Y=1,6)
36   WRITE(ILP,45) (I(3,Y),Y=1,6)
   WRITE(ILP,46) (I(4,Y),Y=1,6)
38   WRITE(ILP,47) (I(5,Y),Y=1,6)
   WRITE(ILP,64) (I(6,Y),Y=1,6)
40 C THIS SEGMENT CALCULATES AND PRINTS PROBABILITY MATRIX
   WRITE (ILP,53)
42 53 FORMAT (///1X,*** TRANSITION PROBABILITY MATRIX ***)
   DO 21 X=1,6
44   DO 21 Y=1,6
   IF (X.EQ.Y) GO TO 110
46   IF (SUMI(X).EQ.0.0) GO TO 110
   R(X,Y)=(FLOAT(I(X,Y)))/(FLOAT(SUMI(X)))
48   GO TO 21
110 R(X,Y)=0.0
50 21 CONTINUE
   WRITE (ILP,54)
52   WRITE(ILP,55) (R(1,Y),Y=1,6)
   WRITE(ILP,56) (R(2,Y),Y=1,6)
54   WRITE(ILP,57) (R(3,Y),Y=1,6)
   WRITE(ILP,58) (R(4,Y),Y=1,6)
56
58
60
62
64

```

```
WRITE(ILP,59) (R(5,Y),Y=1,6)
```

```
WRITE(ILP,65) (R(6,Y),Y=1,6)
```

```
54 FORMAT (1' (3) (4) (5) (2) (6)')
```

```
55 FORMAT (1X,'FROM (1)',2X,6F15.5)
```

```
56 FORMAT (1X,' (2)',2X,6F15.5)
```

```
57 FORMAT (1X,' (3)',2X,6F15.5)
```

```
58 FORMAT (1X,' (4)',2X,6F15.5)
```

```
59 FORMAT (1X,' (5)',2X,6F15.5)
```

```
65 FORMAT (1X,' (6)',2X,6F15.5)
```

```
C THIS SEGMENT CALCULATES AND PRINTS INDEPENDENT TRIALS MATRIX
```

```
WRITE (ILP,60)
```

```
60 FORMAT (///1X,'** INDEPENDENT TRIALS MATRIX **')
```

```
DO 22 X=1,6
```

```
DO 22 Y=1,6
```

```
IF (X.EQ.Y) GO TO 107
```

```
EQUIVA=FLOAT(TOTAL-SUMI(X))
```

```
IF (EQUIVA.EQ.0.0) GO TO 107
```

```
V(X,Y)=(FLOAT(SUMJ(Y)))/(FLOAT(TOTAL-SUMI(X)))
```

```
GO TO 22
```

```
107 V(X,Y)=0.0
```

```
22 CONTINUE
```

```
DO 26 X=1,6
```

```
26 SUMV(X)=V(X,1)+V(X,2)+V(X,3)+V(X,4)+V(X,5)
```

```
DO 25 X=1,6
```

```
DO 25 Y=1,6
```

```
IF (X.EQ.Y) GO TO 109
```

```
IF (V(X,Y).EQ.0.0) GO TO 109
```

```
IF (SUMV(X).EQ.0.0) GO TO 109
```

```
V(X,Y)=(V(X,Y))/(SUMV(X))
```

```
GO TO 25
```

```
109 V(X,Y)=0.0
```

```
25 CONTINUE
```

```
WRITE (ILP,54)
```

```
WRITE(ILP,55) (V(1,Y),Y=1,6)
```

```
WRITE(ILP,56) (V(2,Y),Y=1,6)
```

```
WRITE(ILP,57) (V(3,Y),Y=1,6)
```

```
WRITE(ILP,58) (V(4,Y),Y=1,6)
```

```
WRITE(ILP,59) (V(5,Y),Y=1,6)
```

```
WRITE(ILP,65) (V(6,Y),Y=1,6)
```

```
C THIS SEGMENT CALCULATES AND PRINTS DIFFERENCE MATRIX
```

```
WRITE (ILP,61)
```

```
61 FORMAT (///1X,'** DIFFERENCE MATRIX **')
```

```
DO 23 X=1,6
```

```
DO 23 Y=1,6
```

```
23 W(X,Y)=R(X,Y)-V(X,Y)
```

```
WRITE (ILP,54)
```

```
WRITE(ILP,55) (W(1,Y),Y=1,6)
```

```
WRITE(ILP,56) (W(2,Y),Y=1,6)
```

```
WRITE(ILP,57) (W(3,Y),Y=1,6)
```

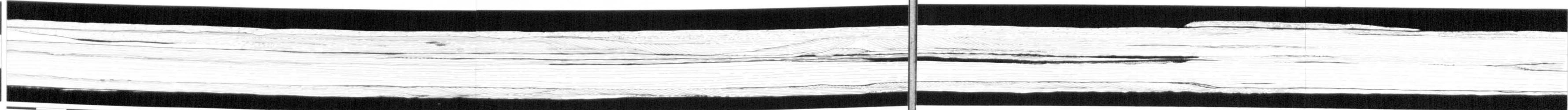
```

6 WRITE(ILP,58) (W(4,Y),Y=1,6)
  WRITE(ILP,59) (W(5,Y),Y=1,6)
8  WRITE(ILP,65) (W(6,Y),Y=1,6)
  C THIS SEGMENT CALCULATES AND PRINTS K-STATISTIC MATRIX
10 WRITE (ILP,62)
  62 FORMAT (///1X,*** K-STATISTIC MATRIX ***)
12 DO 24 X=1,6
  DO 24 Y=1,6
14 EQUIVB=((FLOAT(I(Y,X)))*(FLOAT(SUMI(Y))))
  IF(EQUIVB.EQ.0.0) GO TO 108
16 U(X,Y)=((FLOAT(I(X,Y)))*(FLOAT(SUMI(X))))/((FLOAT(I(Y,X)))*(FLO
  1AT(SUMI(Y))))
18 GO TO 24
108 U(X,Y)=0.0
20 24 CONTINUE
  WRITE (ILP,54)
22 WRITE(ILP,55) (U(1,Y),Y=1,6)
  WRITE(ILP,56) (U(2,Y),Y=1,6)
24 WRITE(ILP,57) (U(3,Y),Y=1,6)
  WRITE(ILP,58) (U(4,Y),Y=1,6)
26 WRITE(ILP,59) (U(5,Y),Y=1,6)
  WRITE(ILP,65) (U(6,Y),Y=1,6)
28 C THIS SEGMENT CALCULATES AND PRINTS THE VALUE OF CHI-SQUARE BY THE
  C METHOD OF BILLINGSLEY (1961) AND GINGERICH (1969)
30 X=0
  Y=0
32 DIV=0.0
  STORE=0.0
34 CHI1=0.0
  DO 13 X=1,6
36 DO 13 Y=1,6
  DIV=(SUMI(X)*V(X,Y))
38 IF(DIV.EQ.0.0) GO TO 14
  STORE=(((FLOAT(I(X,Y)))-(DIV)**2)/DIV
40 GO TO 15
  14 STORE=0.0
42 15 CHI1=CHI1+STORE
  DIV=0.0
44 STORE=0.0
  13 CONTINUE
46 WRITE(ILP,16) CHI1
  16 FORMAT(1X,'VALUE OF CHI-SQUARE =',F11.5,' BY THE METHOD OF BILLING
48 SLEY (1961) AND GINGERICH (1969).')
  WRITE(ILP,28)
50 28 FORMAT('DEGREES OF FREEDOM=24')
  CALL EXIT
52 END

```


ENCLOSURE 6

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92

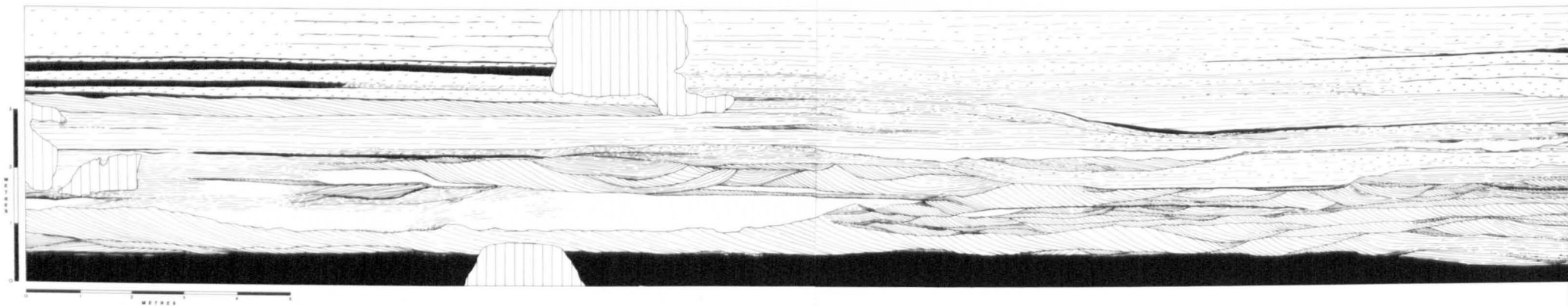


0 1 2 3 4 5
METERS

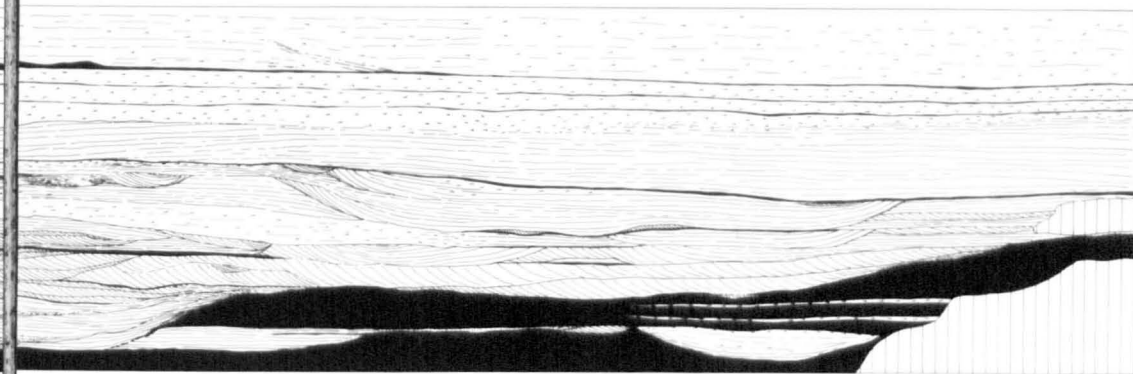
A
B
C
D
E
F

ENCLOSURE 7

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54

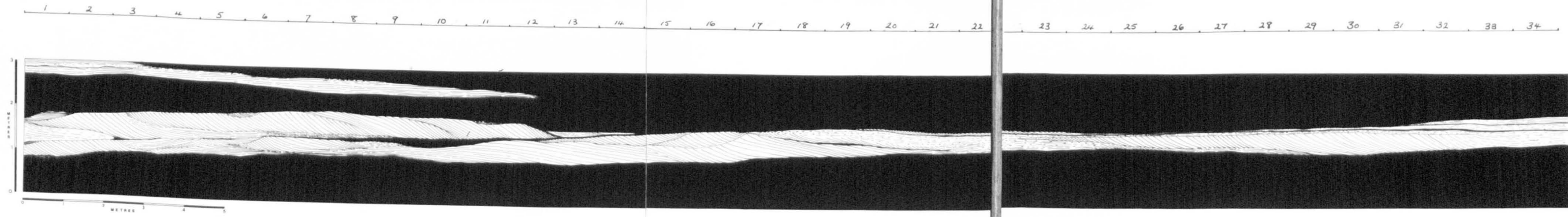


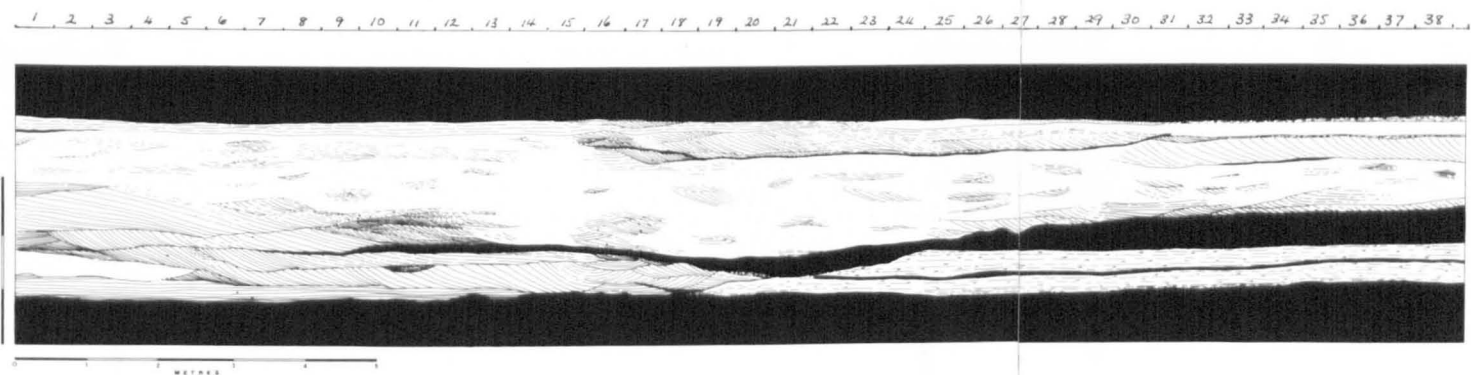
55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83



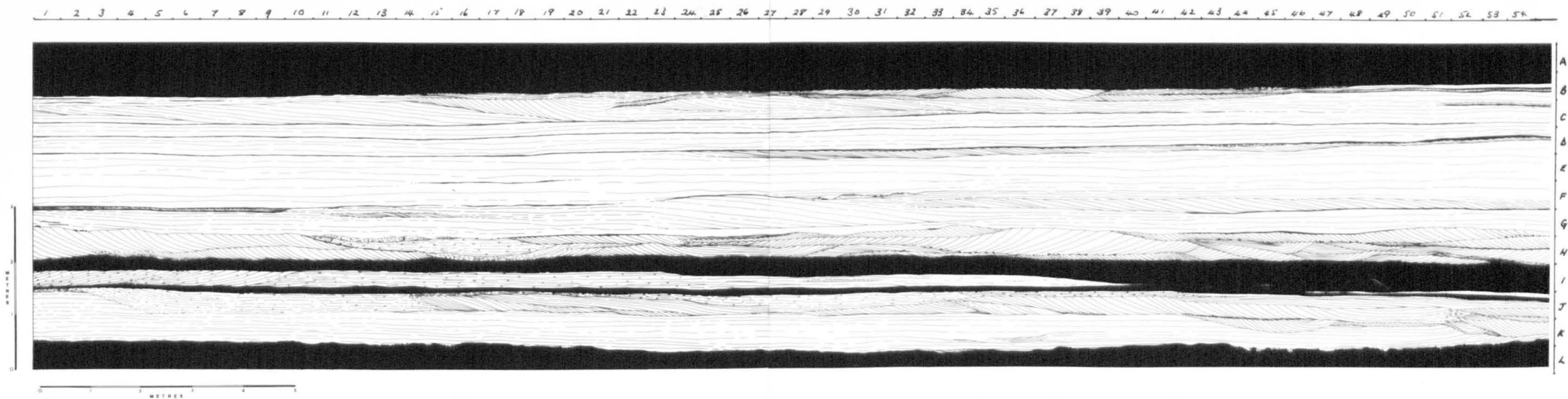
A
B
C
D
E
F
G
H
I
J

ENCLOSURE 8

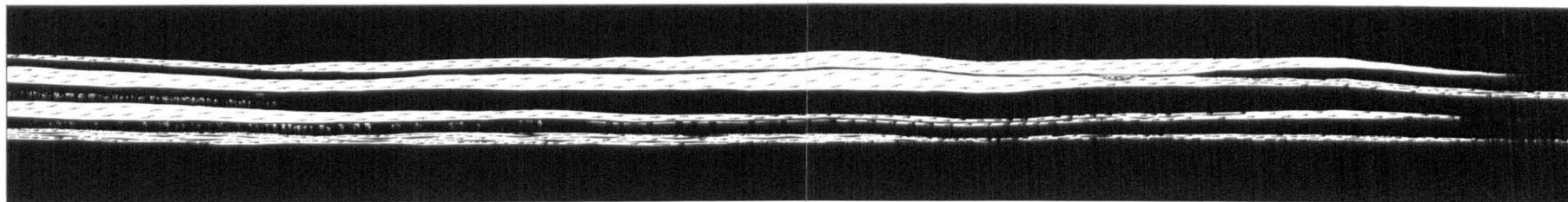




ENCLOSURE 9



ENCLOSURE 10



0 1 2 3 4 5
METRES

ENCLOSURE 11